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**Thompson et al.**

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(54) **LATERAL ARM AWNING SYSTEM AND METHOD OF OPERATION**

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(51) **Int. Cl.**

**E04F 10/00** (2006.01)

**E04F 10/06** (2006.01)

(52) **U.S. Cl.**

CPC ..... **E04F 10/0611** (2013.01); **E04F 10/06**  
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**10/0625** (2013.01); **E04F 10/0637** (2013.01)

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E04F 10/0611; E04F 10/0614; E04F 10/0618;  
E04F 10/0625; E04F 10/0637; E04F 10/064;  
E04F 10/0644; E04F 10/0648; E04F 10/0651;  
E04F 10/655

USPC ..... 160/22, 45, 59, 66, 67, 69, 70, 72, 78,  
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See application file for complete search history.

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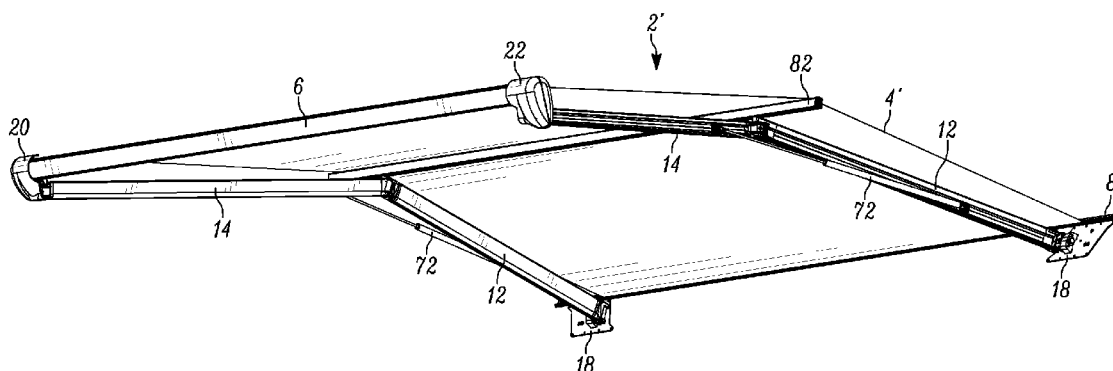
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**ABSTRACT**

A lateral arm assembly and method of operation includes first and second articulating arms comprising first and second ends, the first ends of the articulating arms are mounted upon assembly to a support surface at separate lateral locations. The first ends each comprise separate pivoting mounting structures for forming a first pivotal connection with the first and second articulating arms. The lateral arm assembly also comprises a roller tube having spaced lateral ends supporting respective end brackets that provide a second pivotal connection to the second ends of the articulating arms. The roller tube supports a canopy coupled to a roller shaft, wherein one of the end brackets further supports a device that drives the roller shaft for furling and unfurling the canopy.

**9 Claims, 30 Drawing Sheets**



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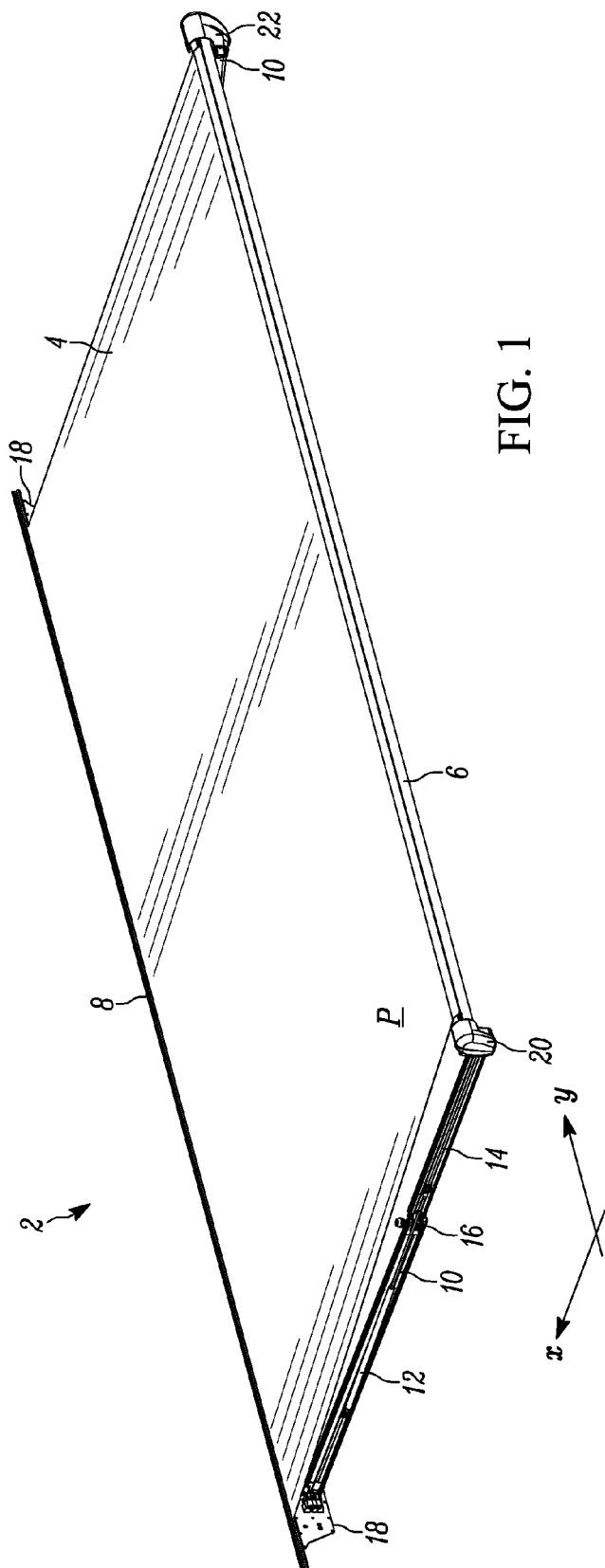
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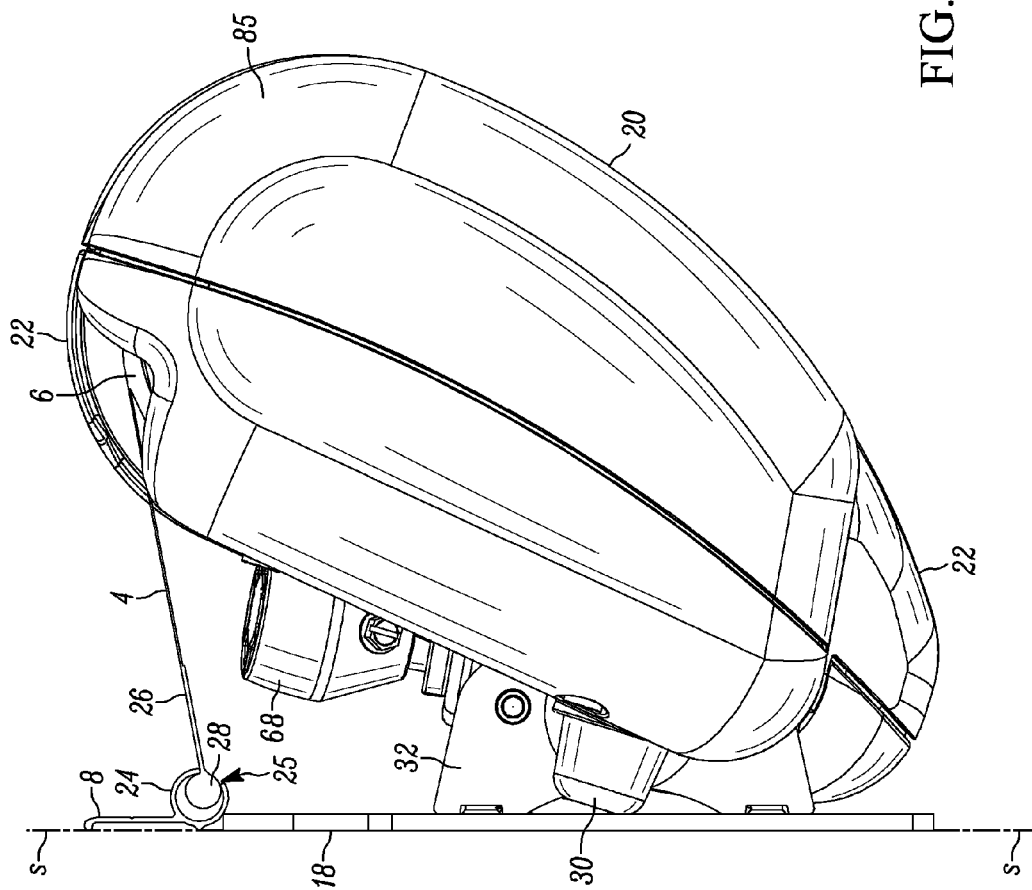


FIG. 2

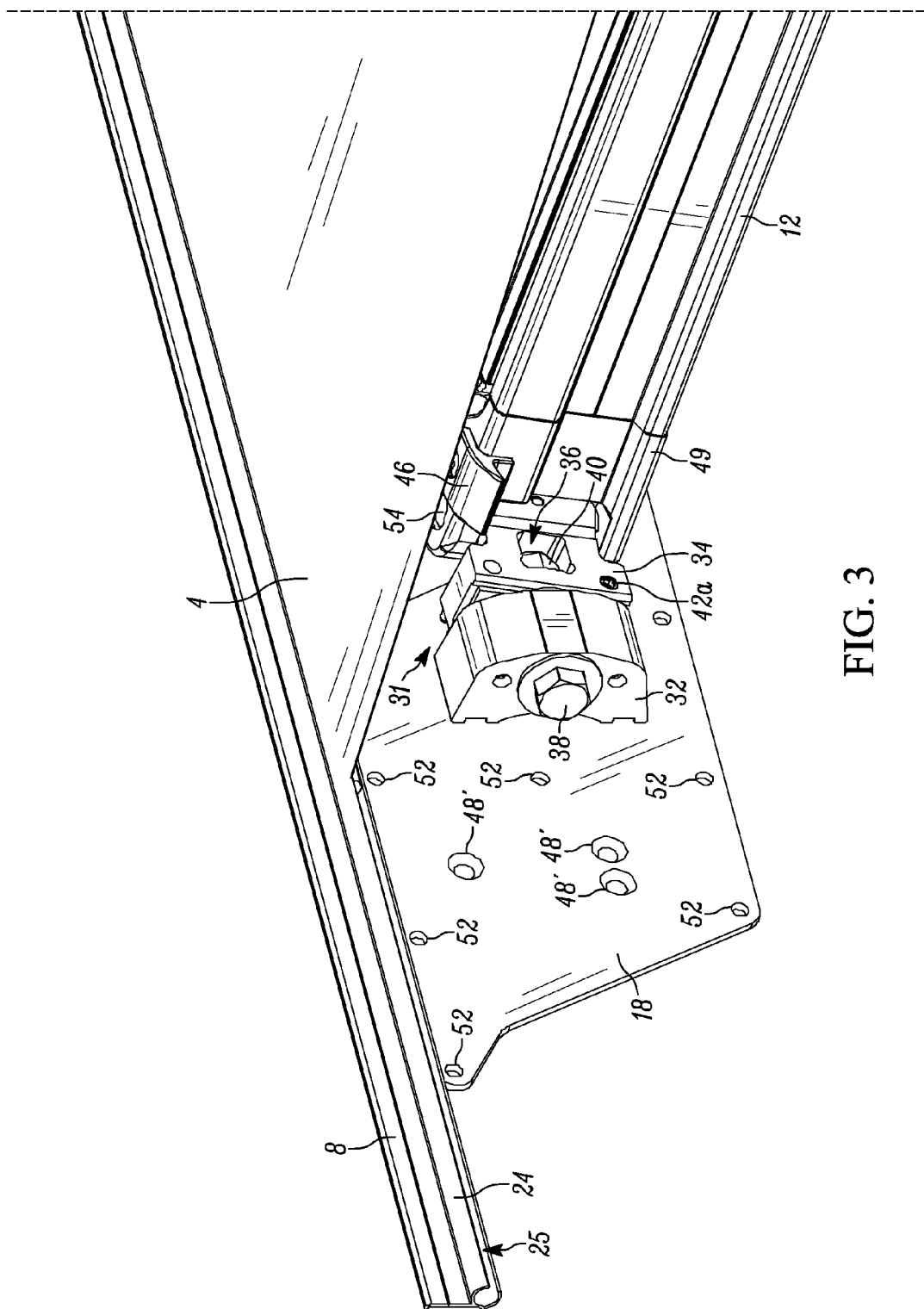


FIG. 3

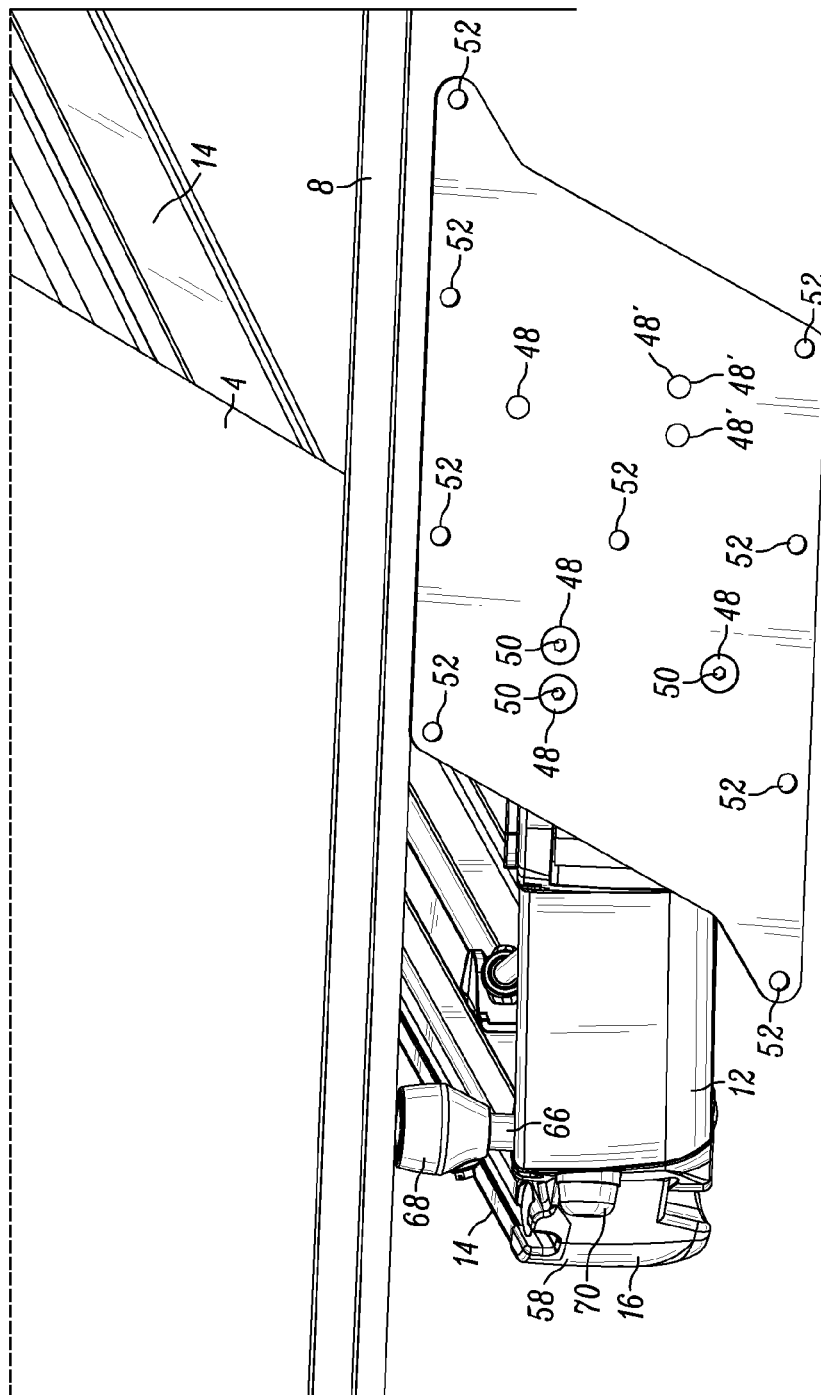


FIG. 4

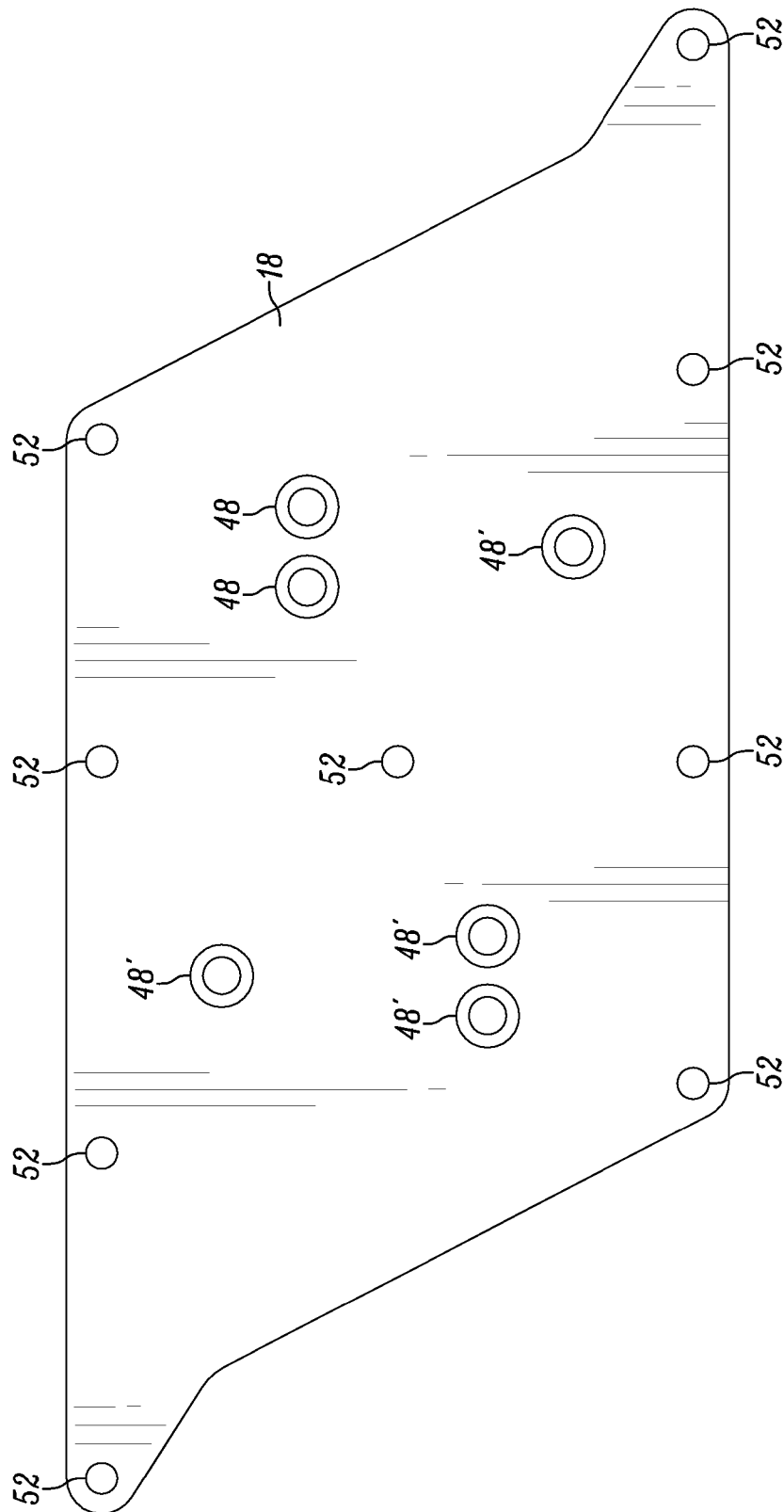


FIG. 5

FIG. 6A

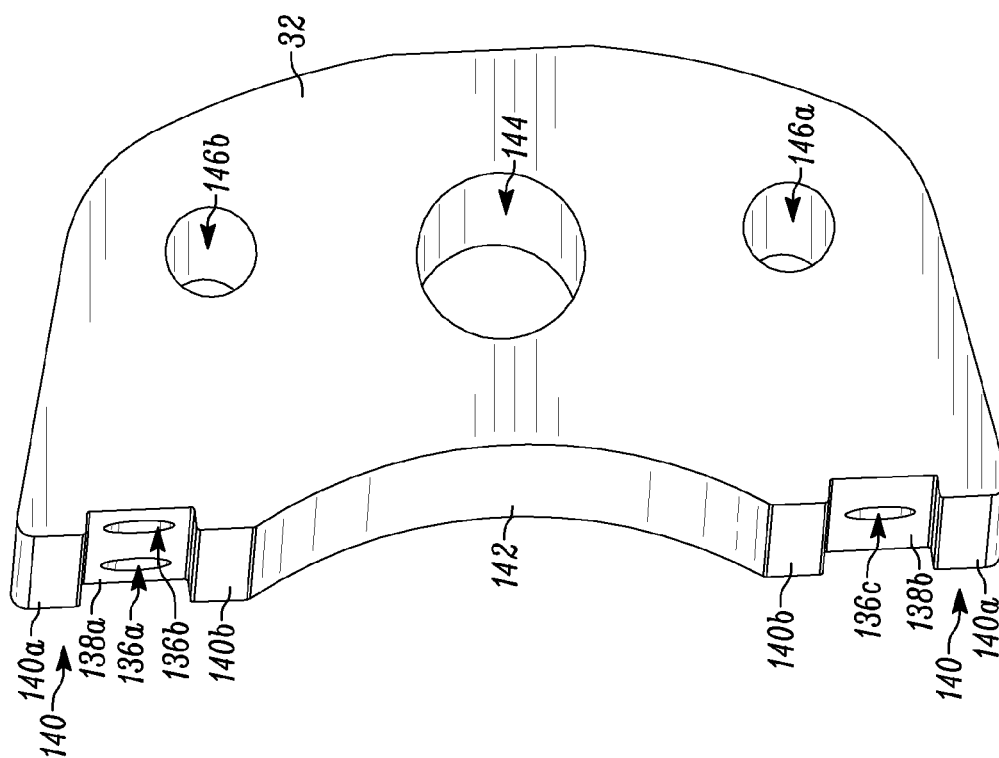
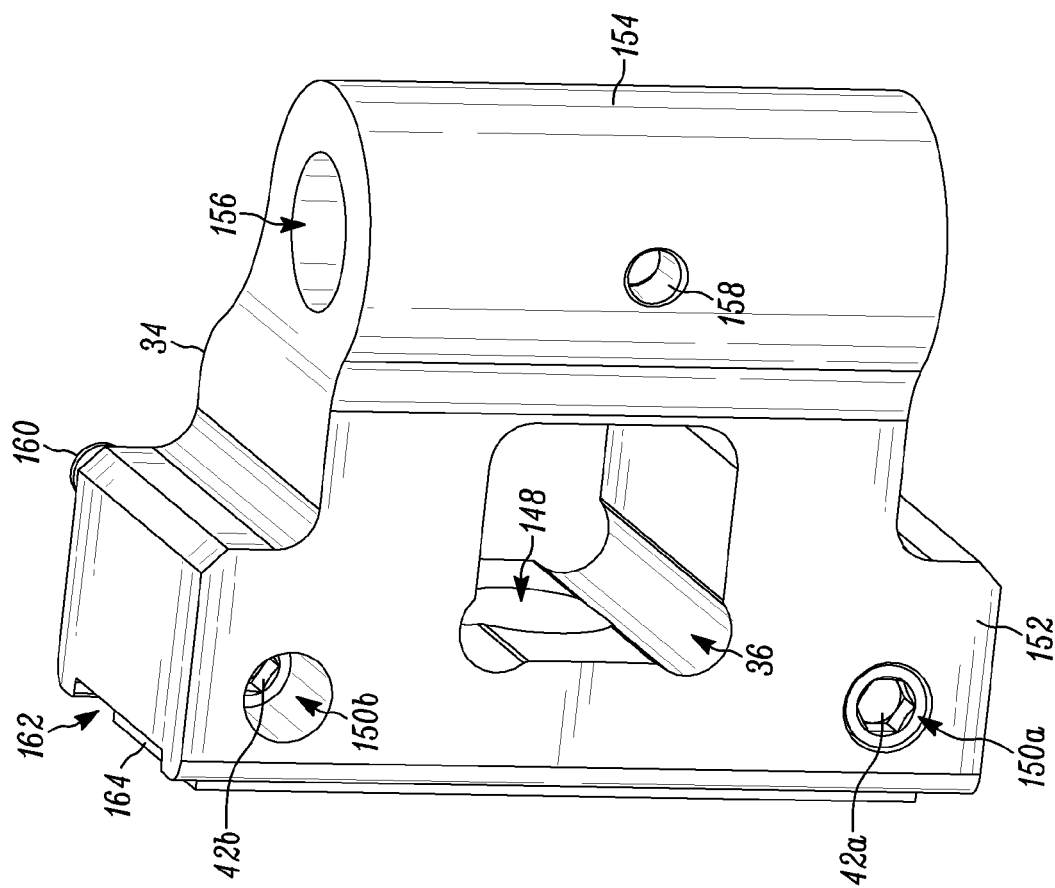




FIG. 6B



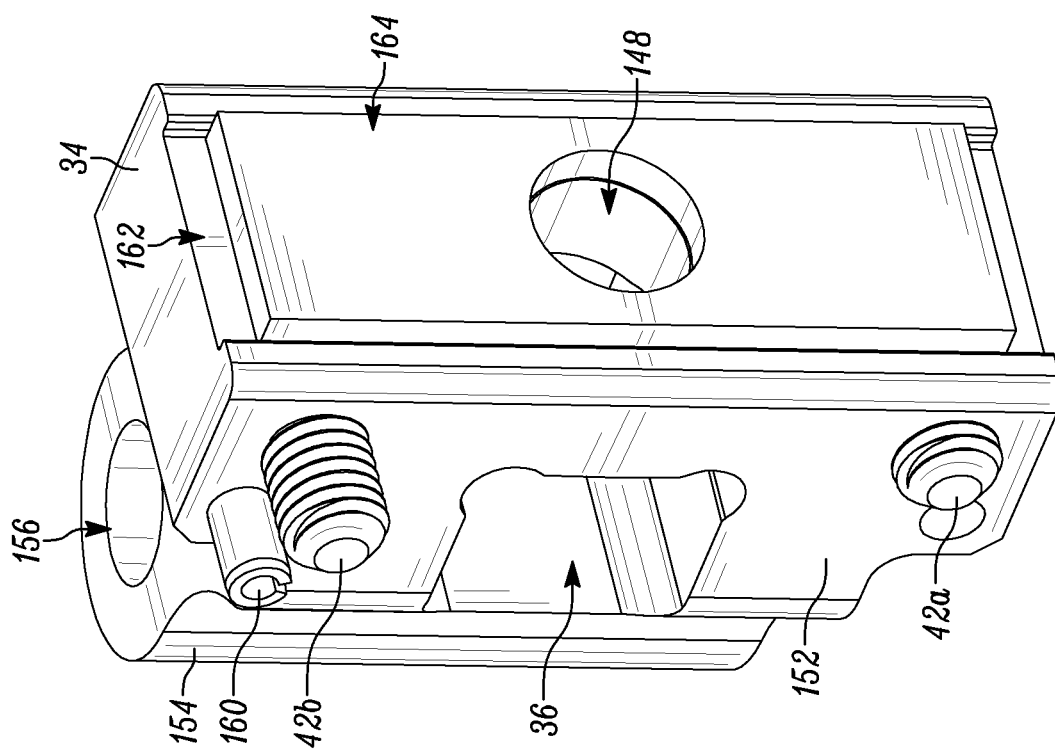
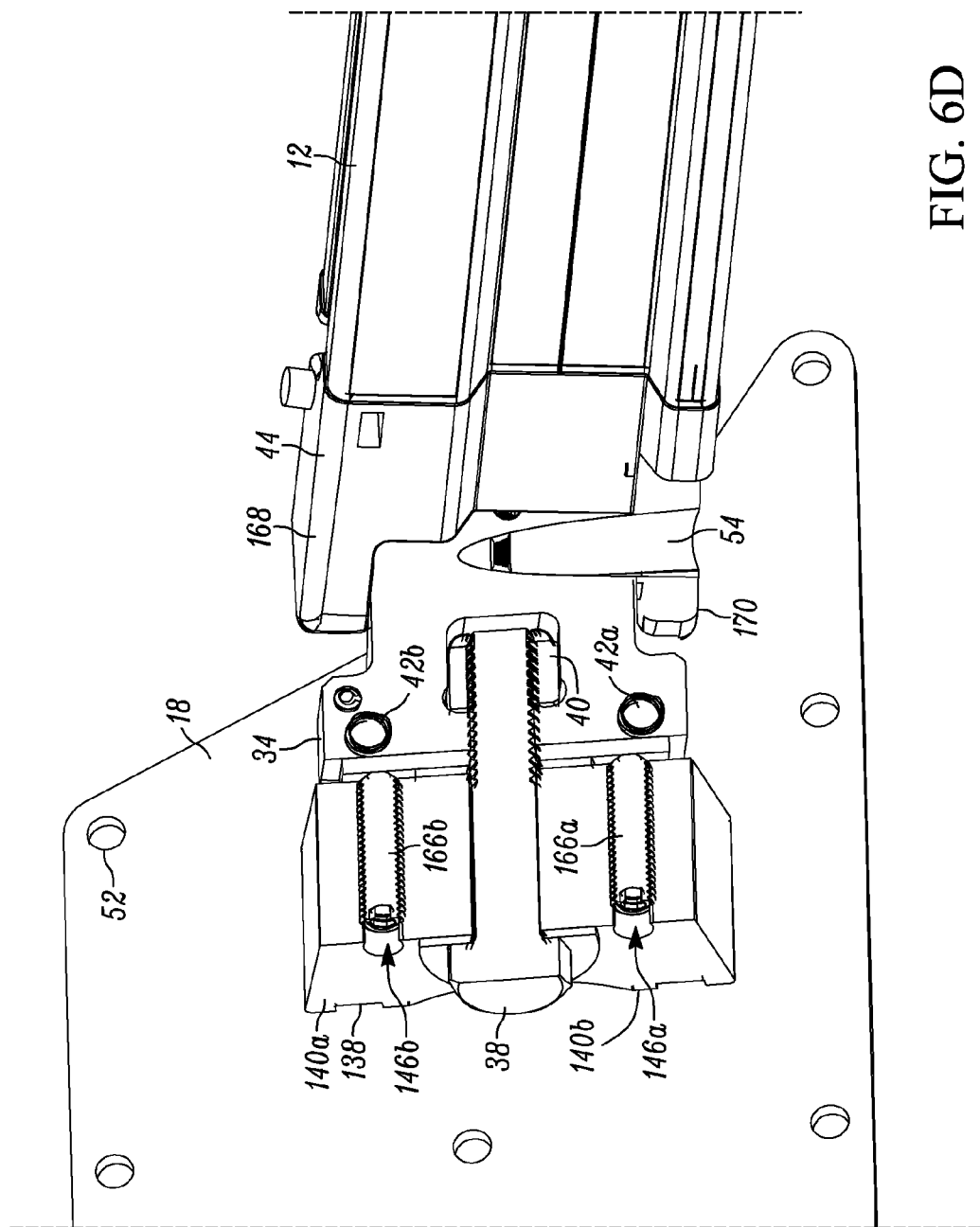


FIG. 6C



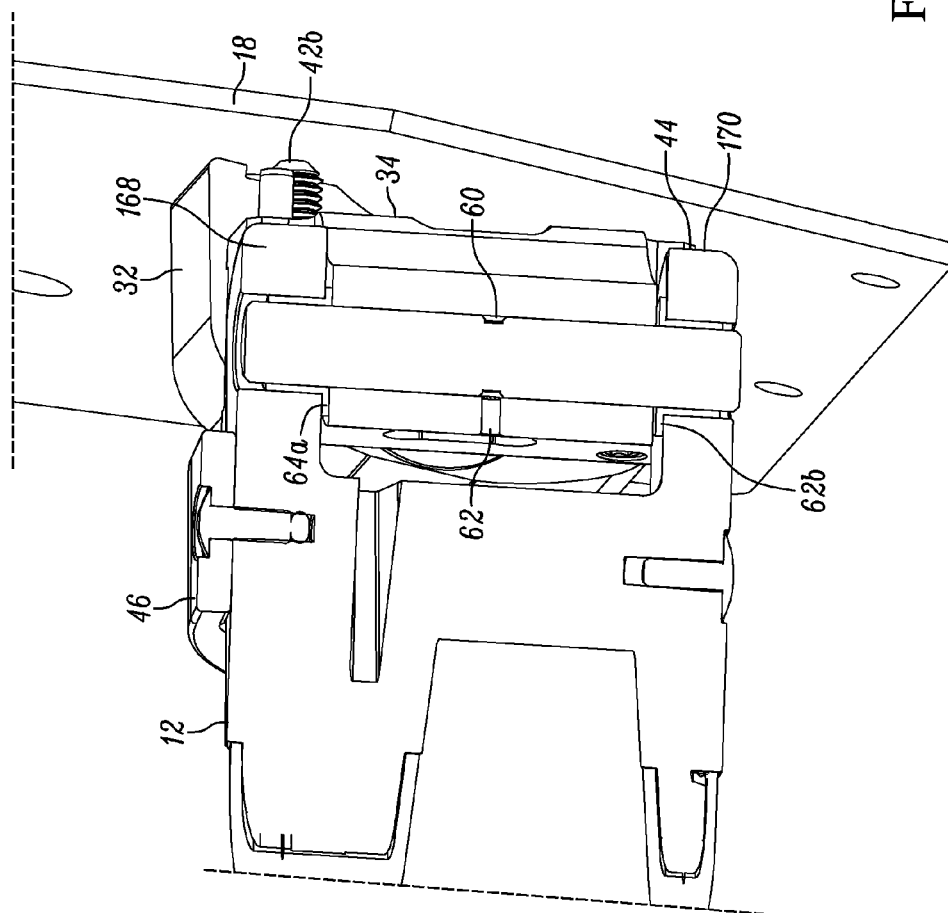


FIG. 6E

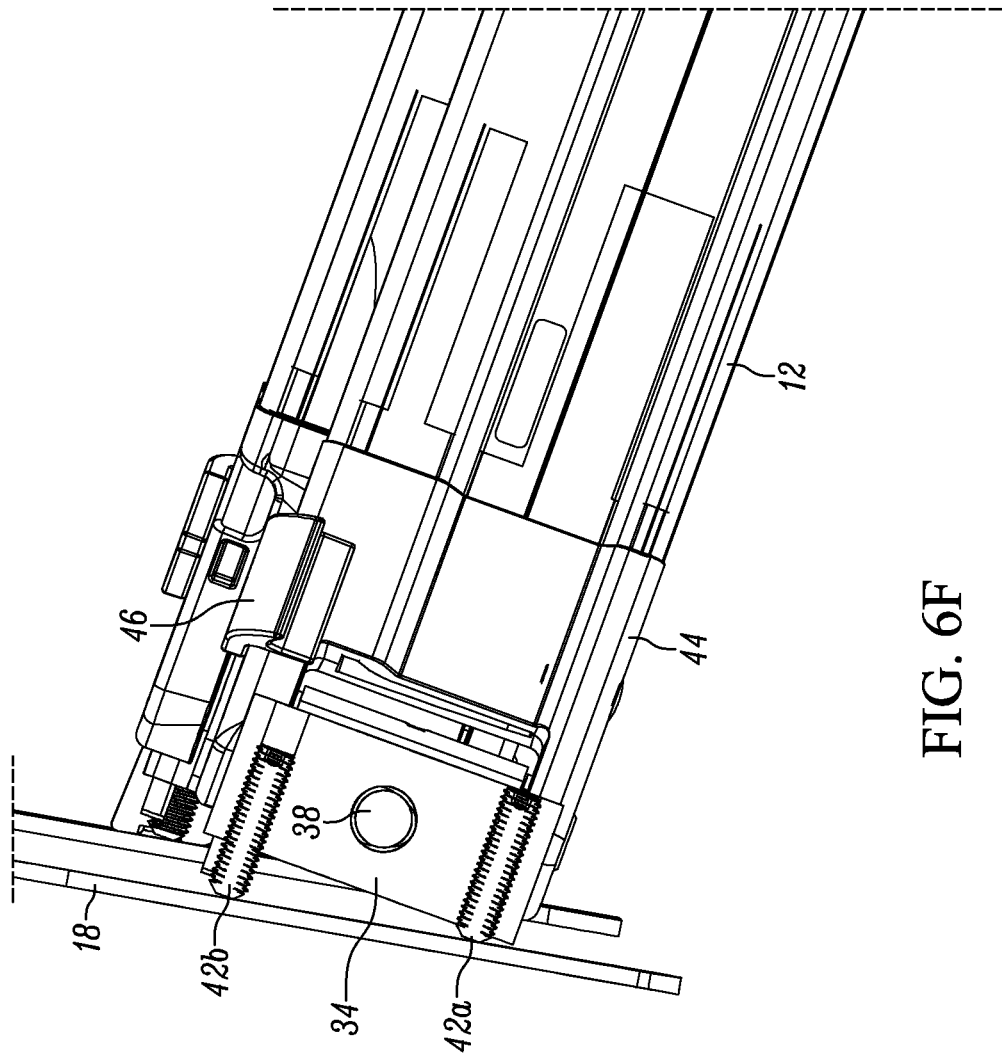


FIG. 6F

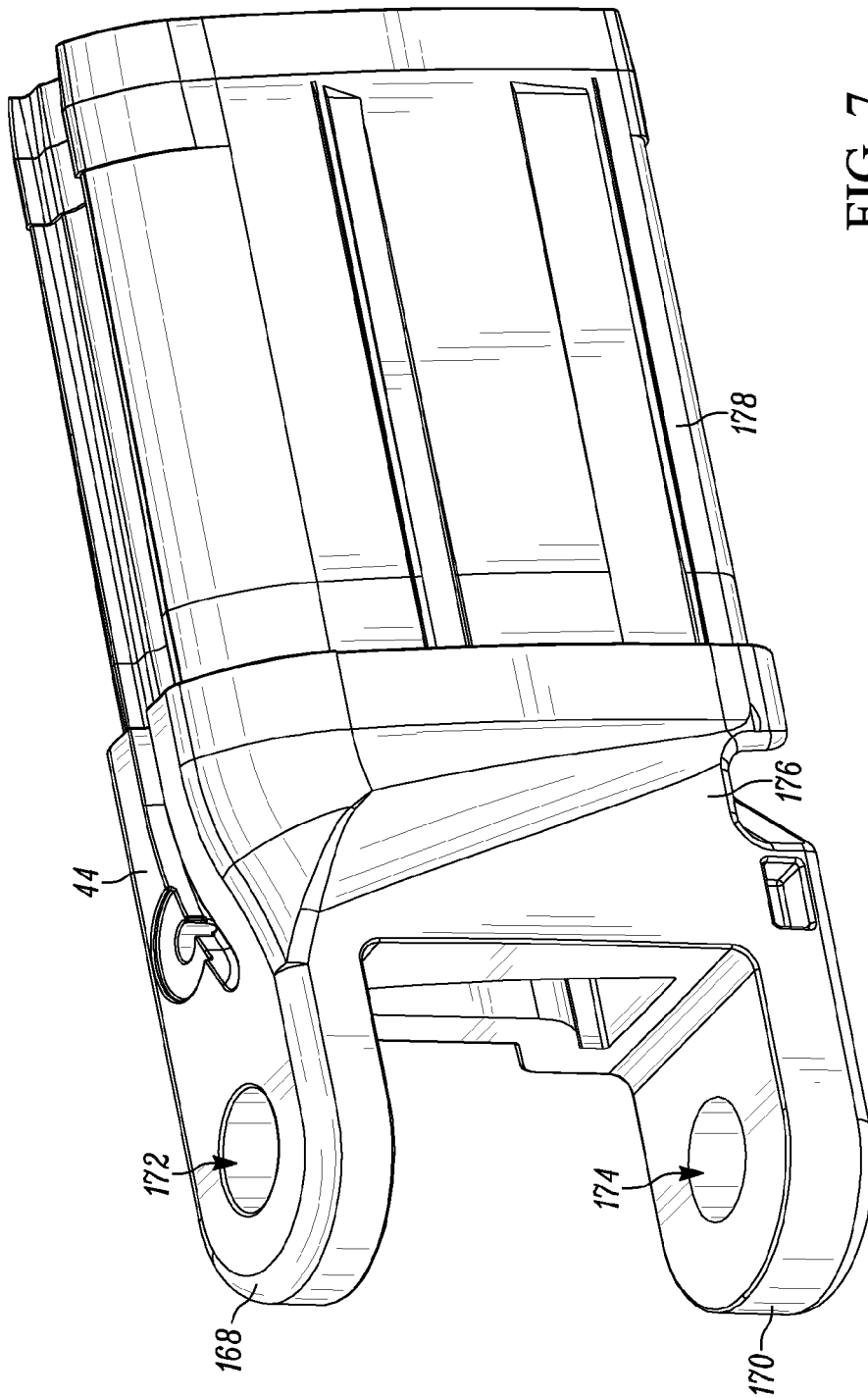


FIG. 7

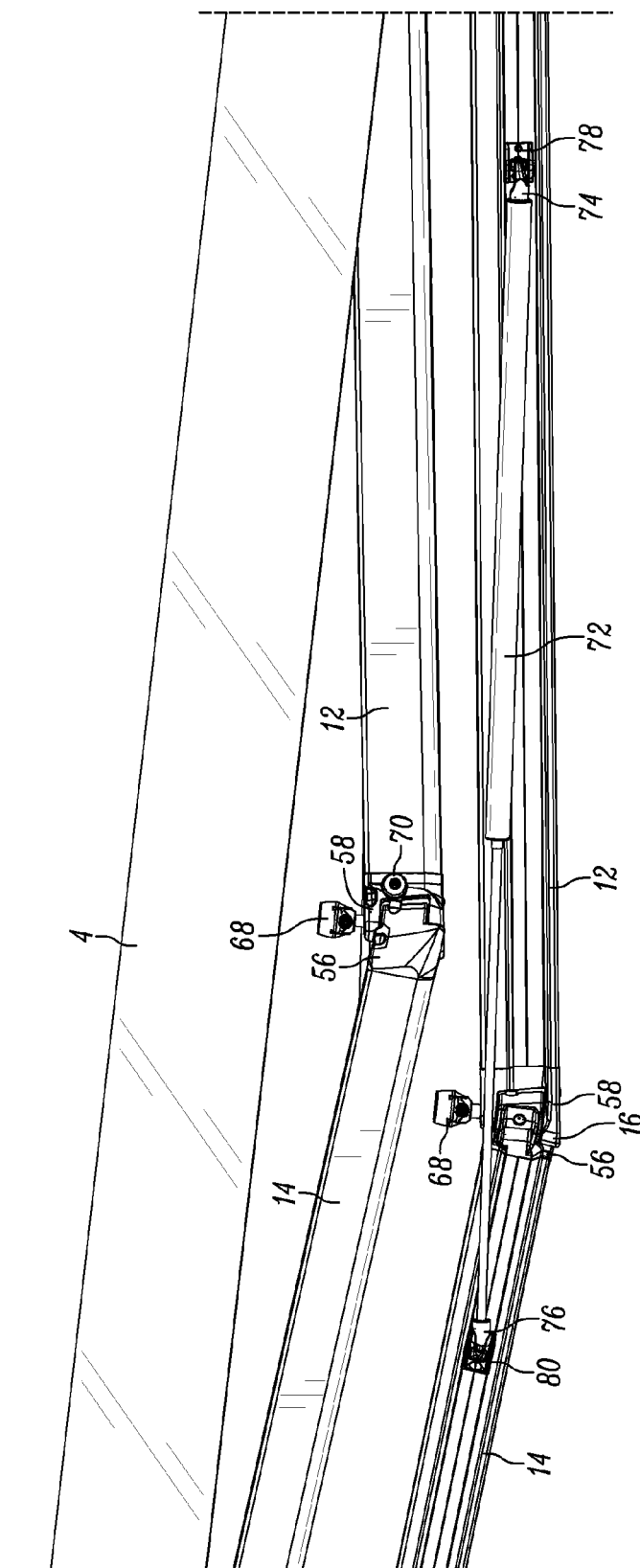


FIG. 8

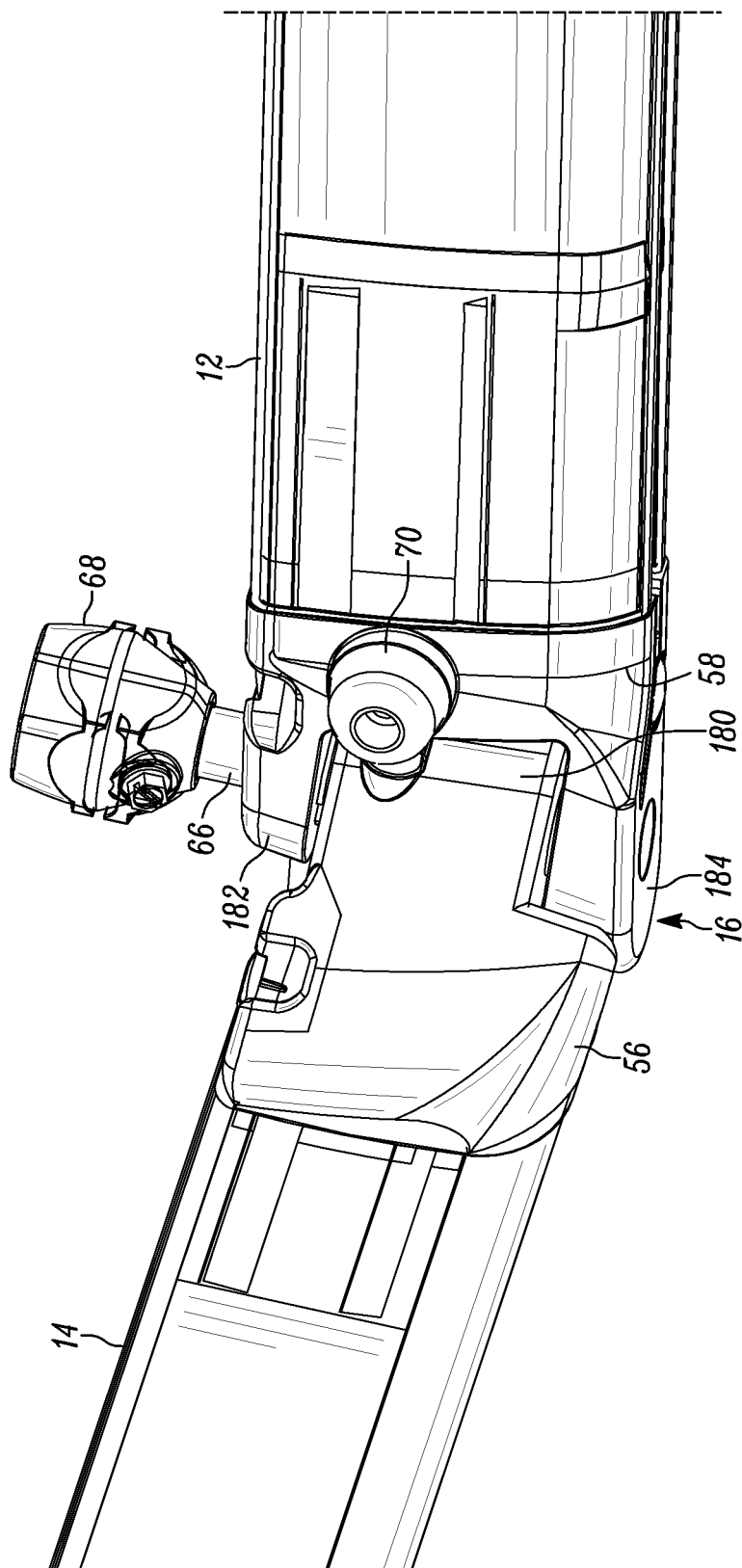


FIG. 9



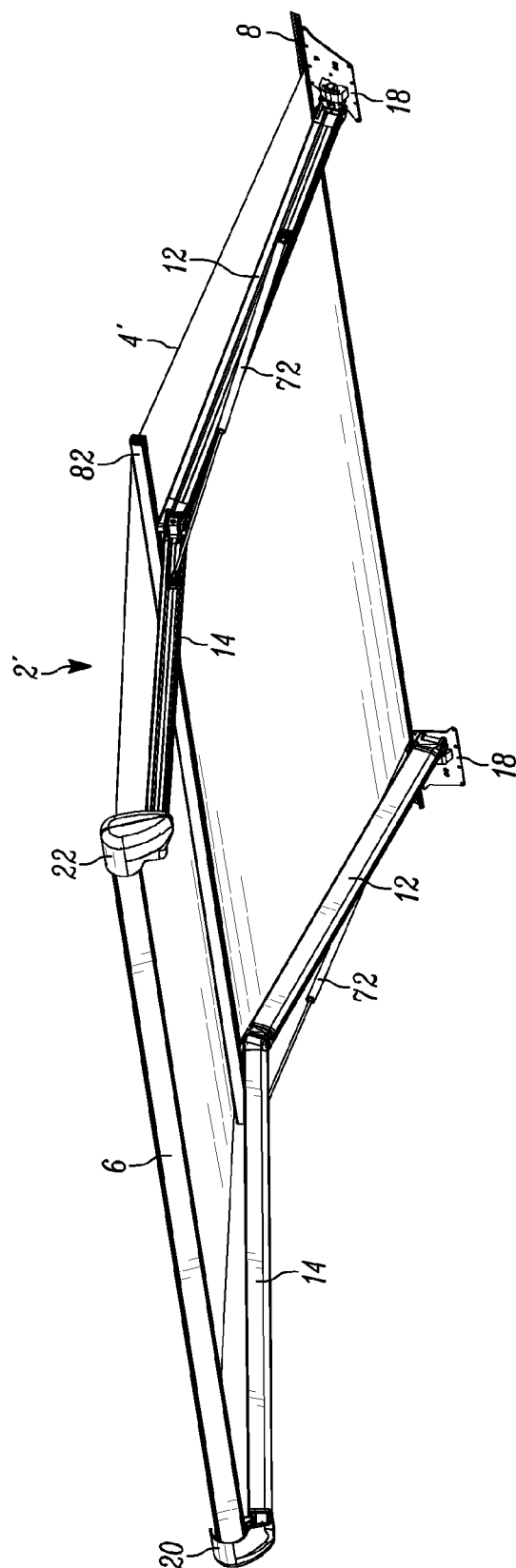


FIG. 10

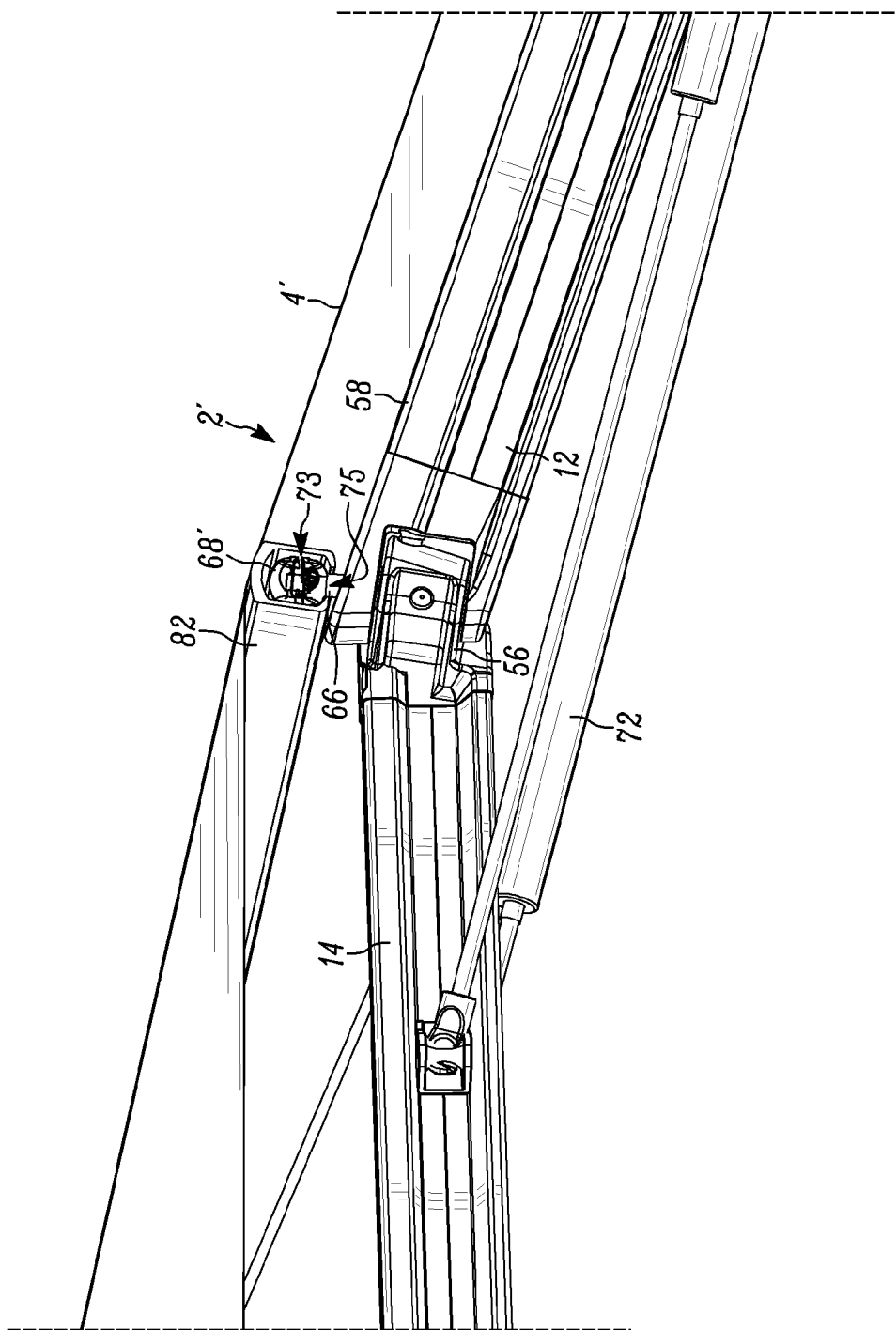


FIG. 11

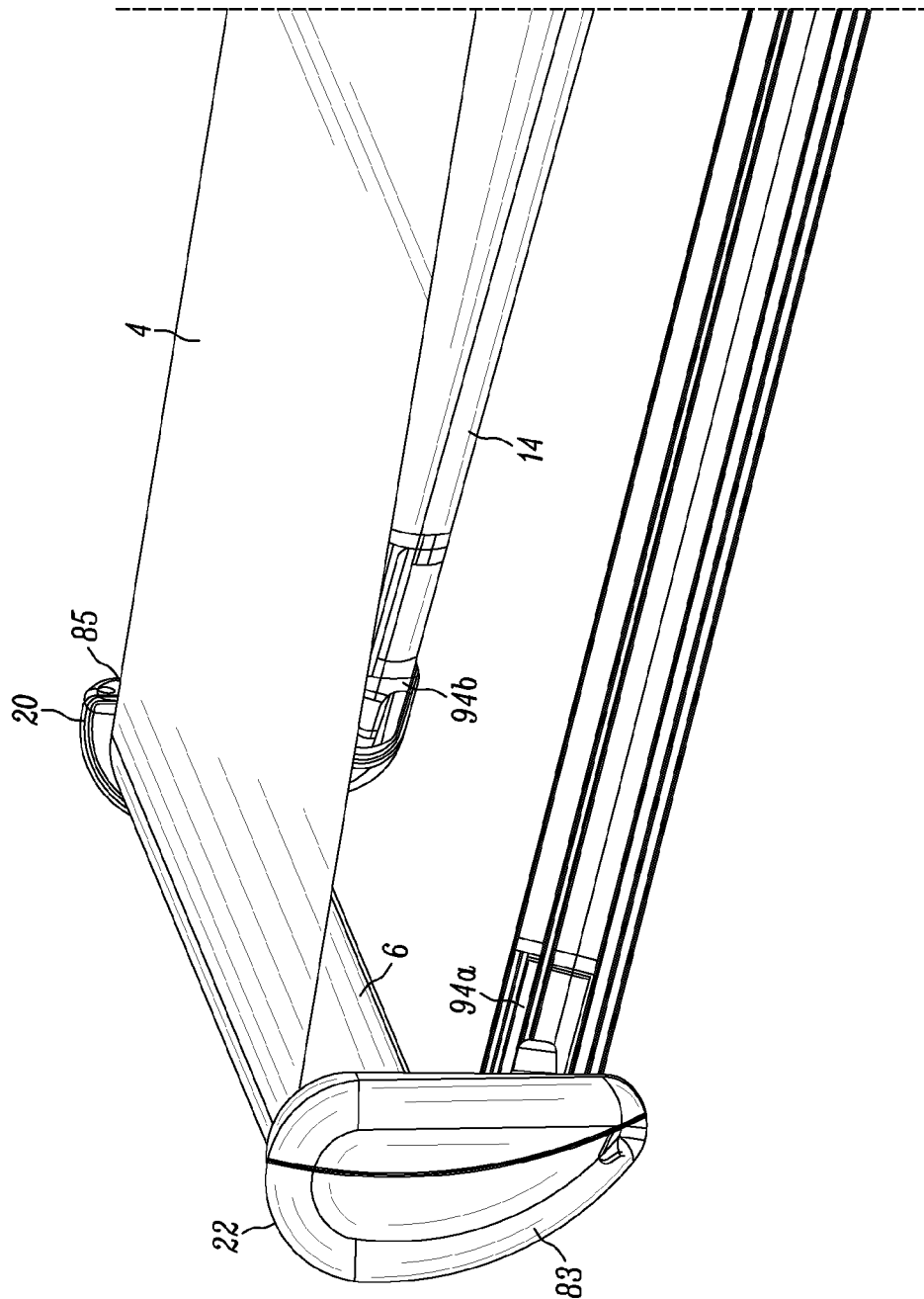


FIG. 12

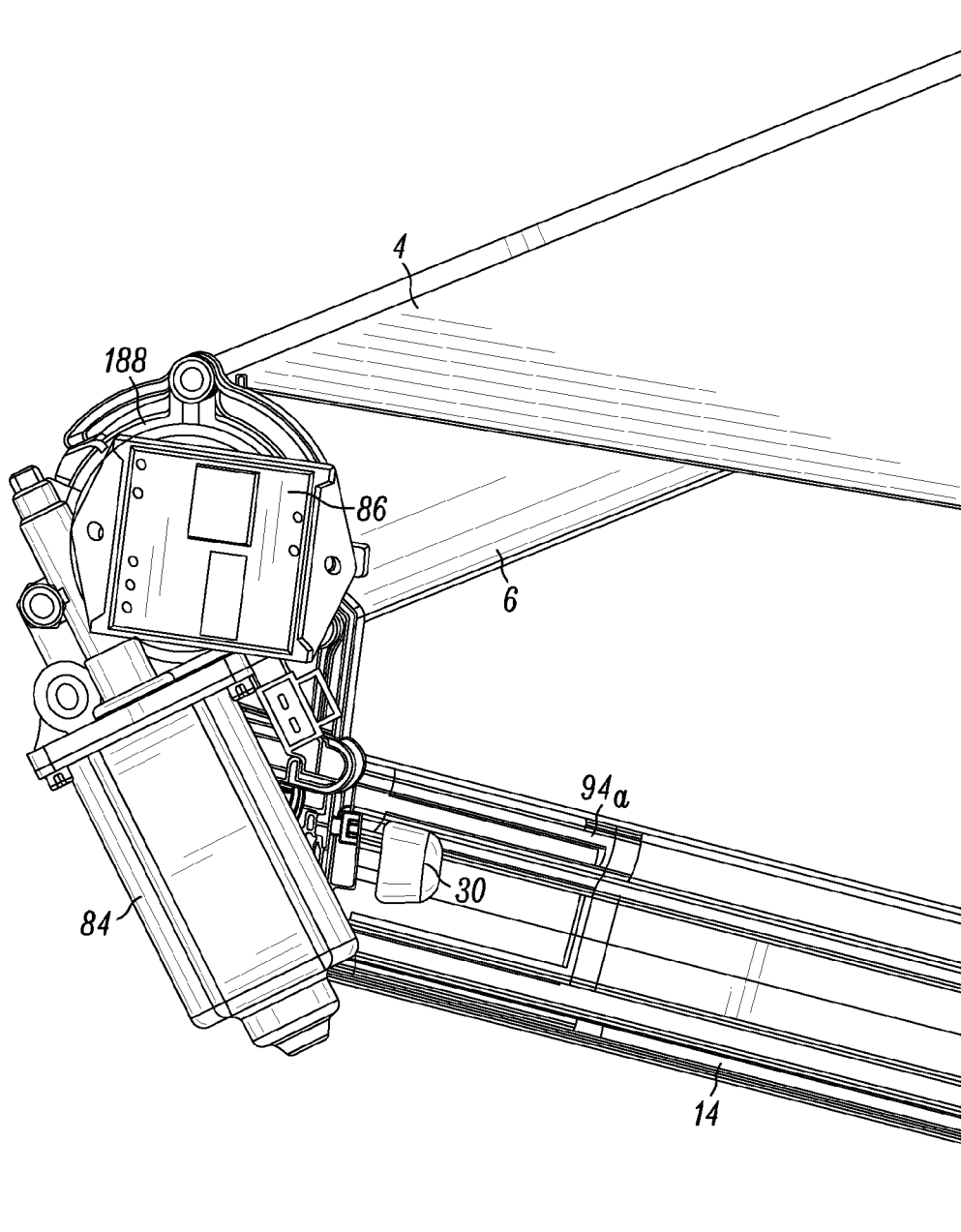
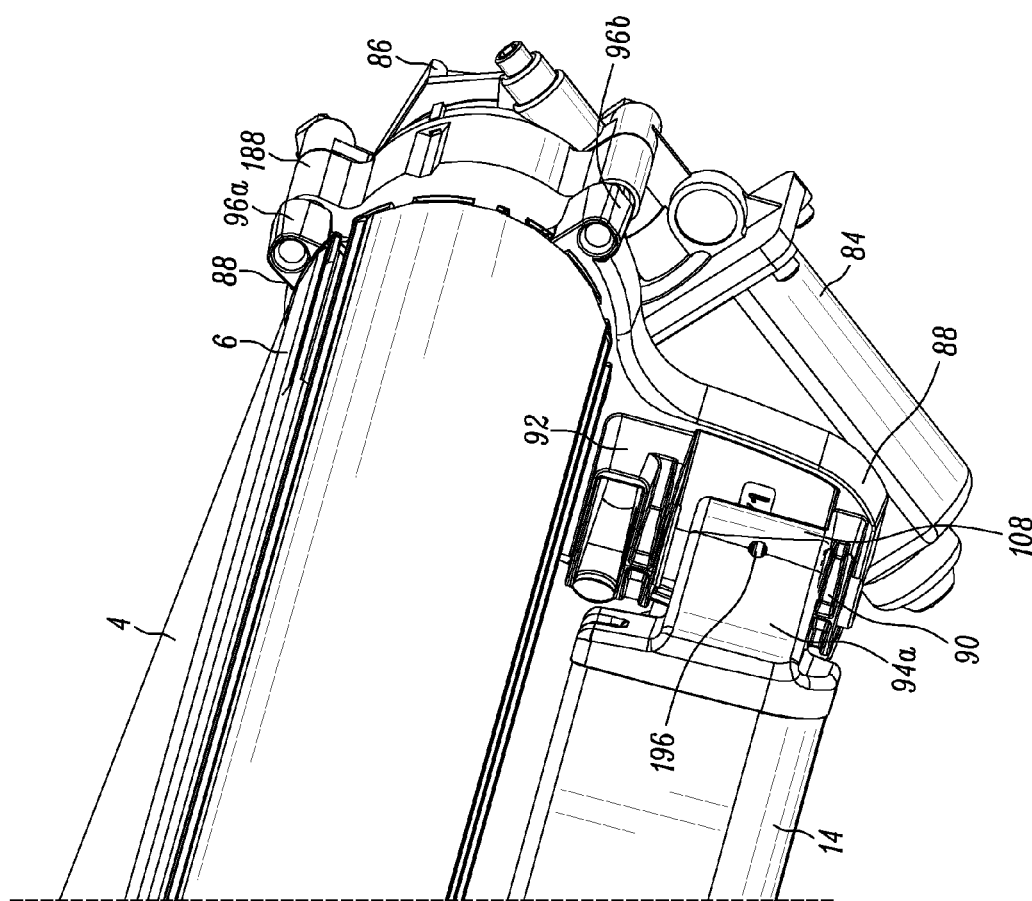


FIG. 13

FIG. 14



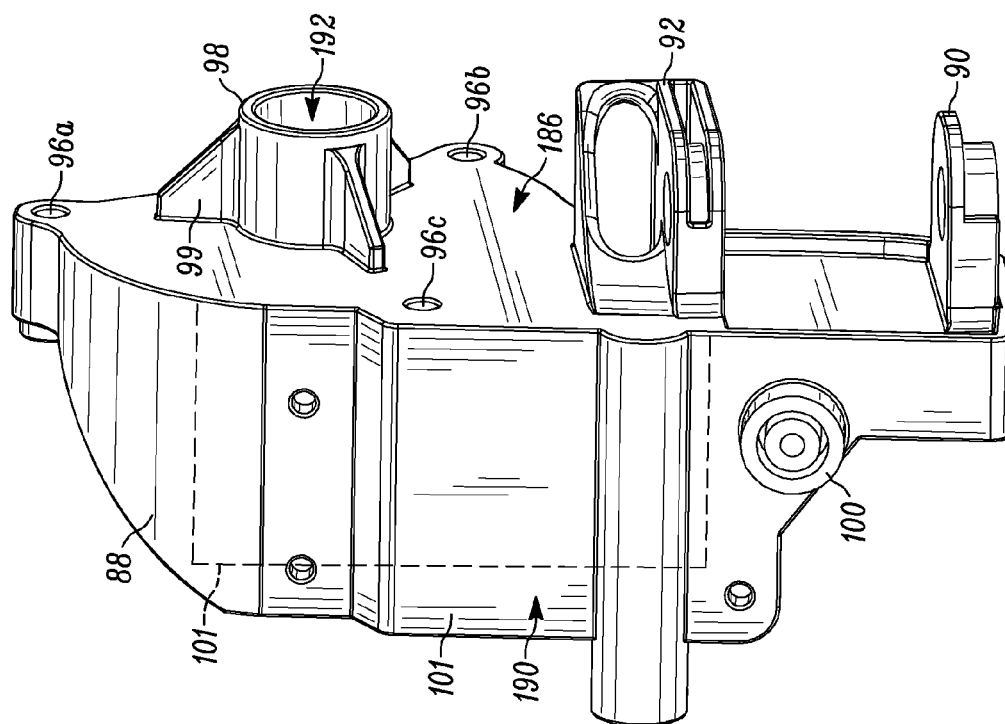


FIG. 15

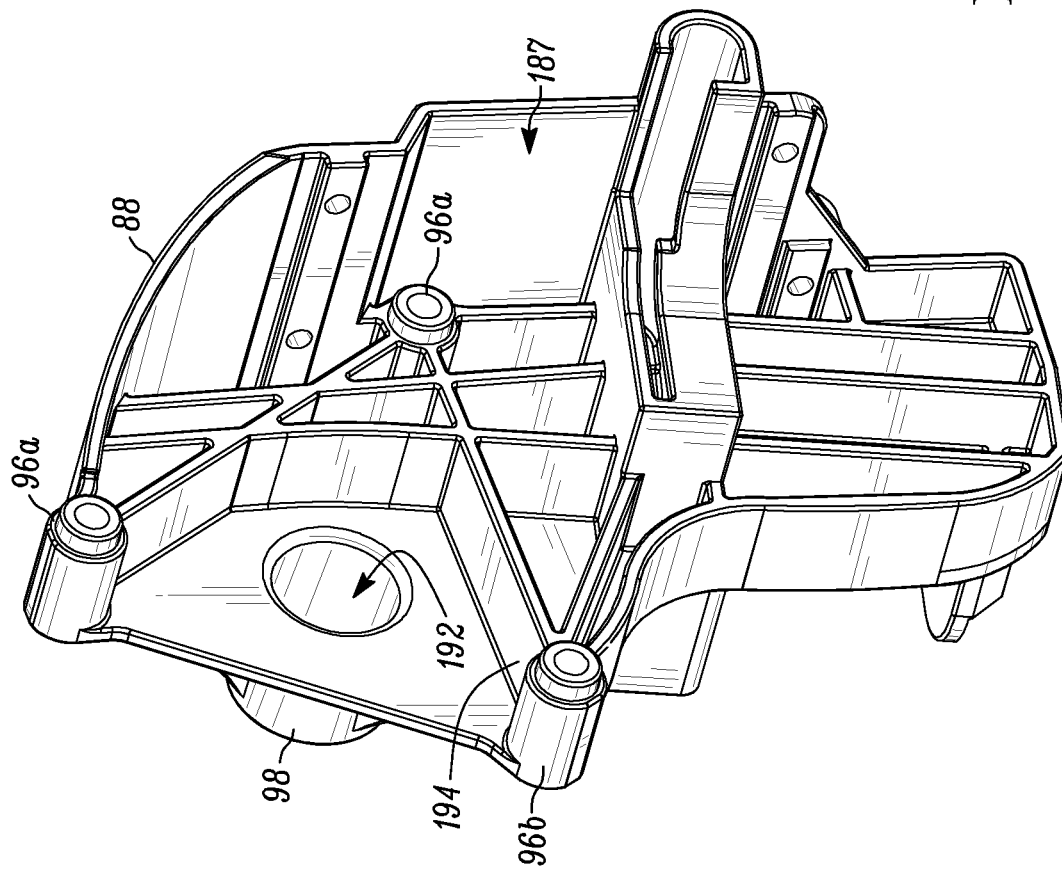


FIG. 16

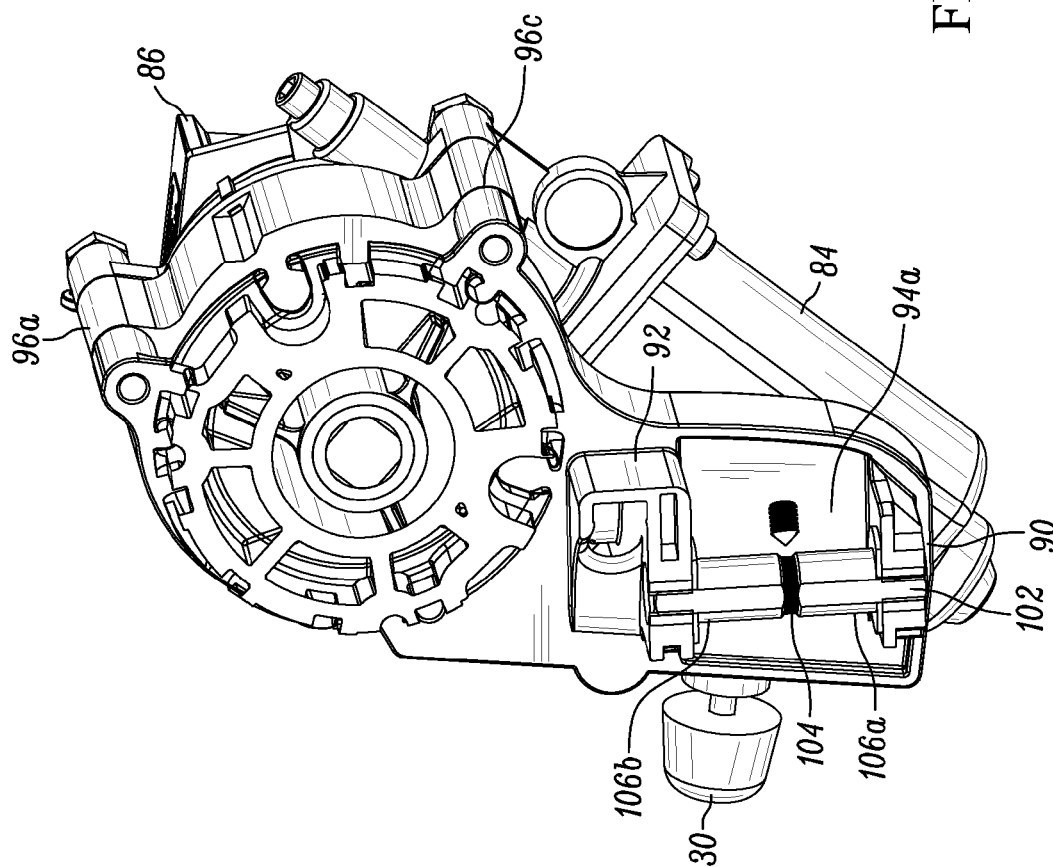


FIG. 17



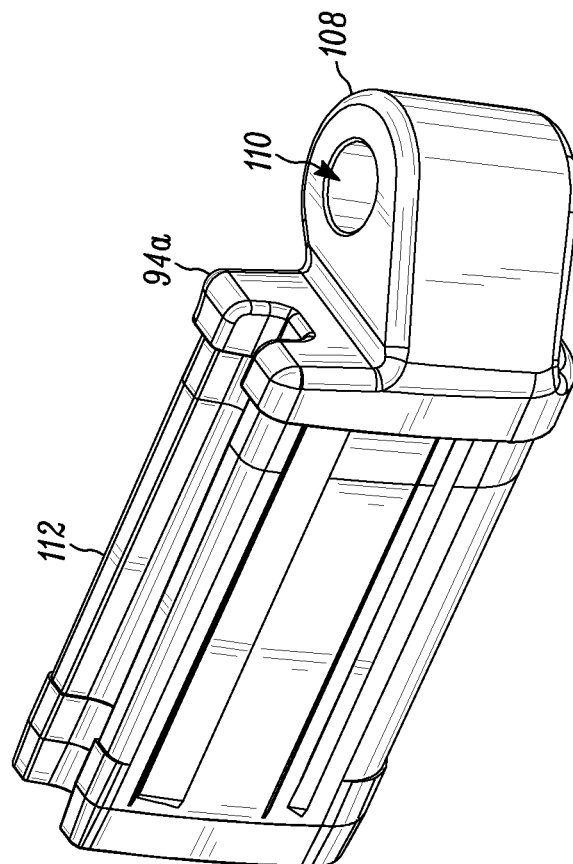


FIG. 18

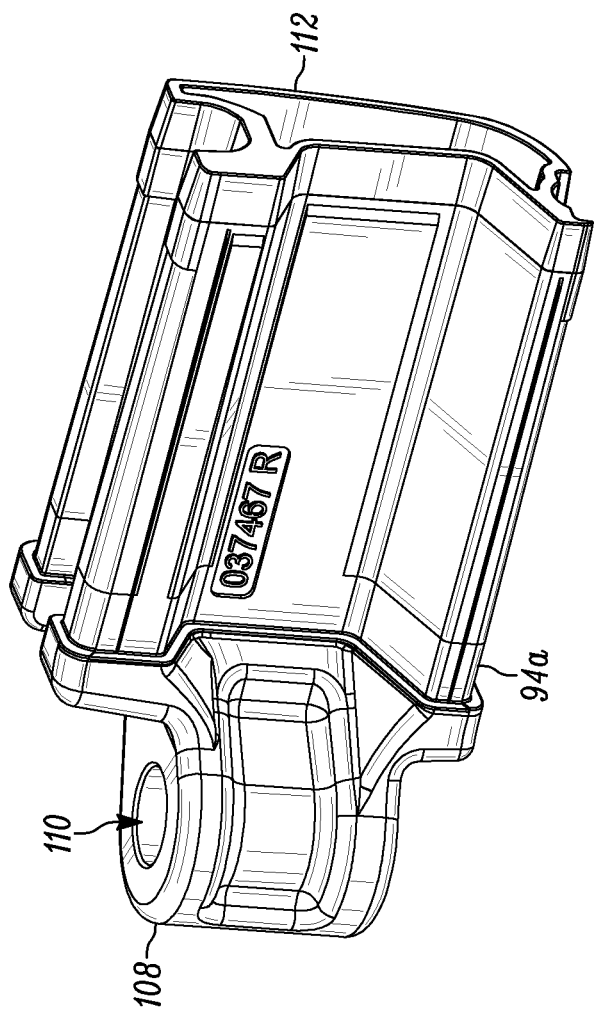


FIG. 19

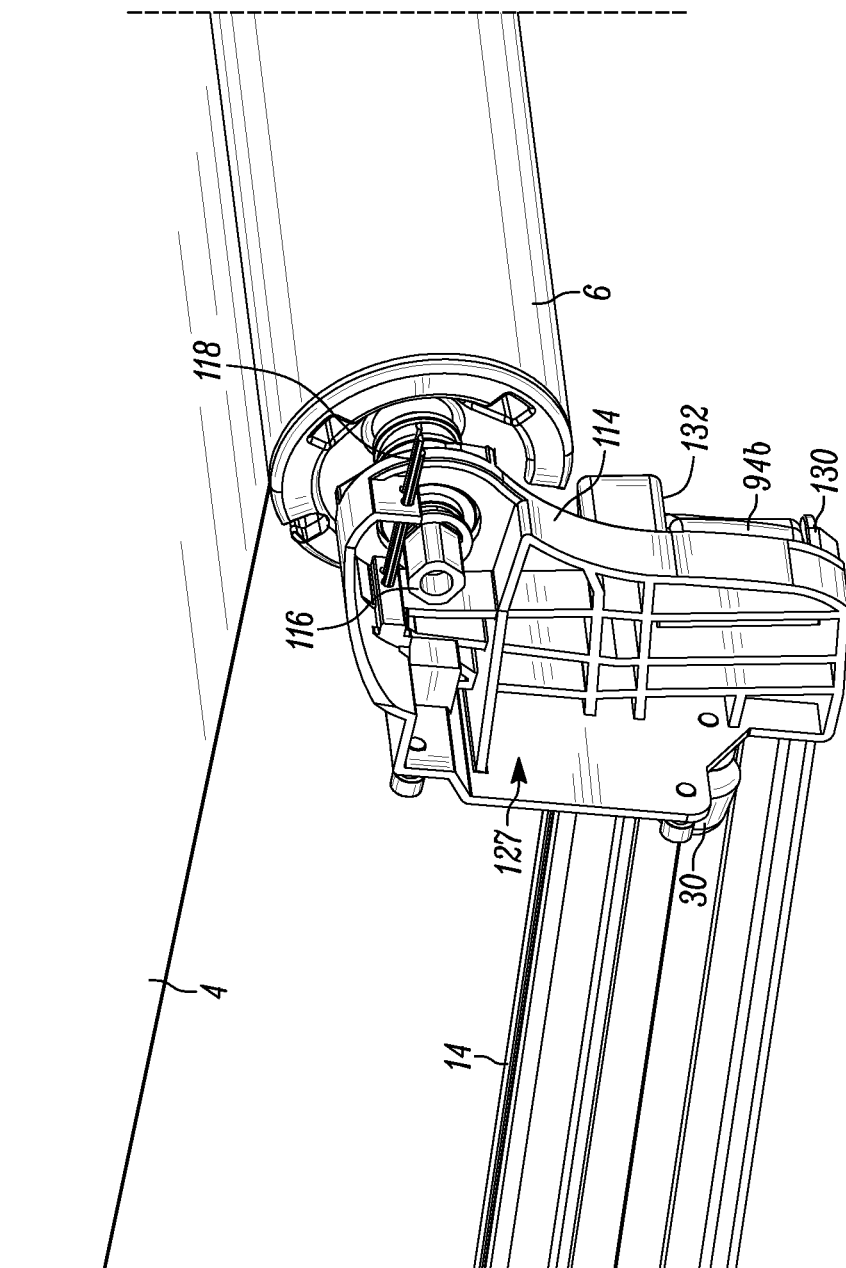


FIG. 20

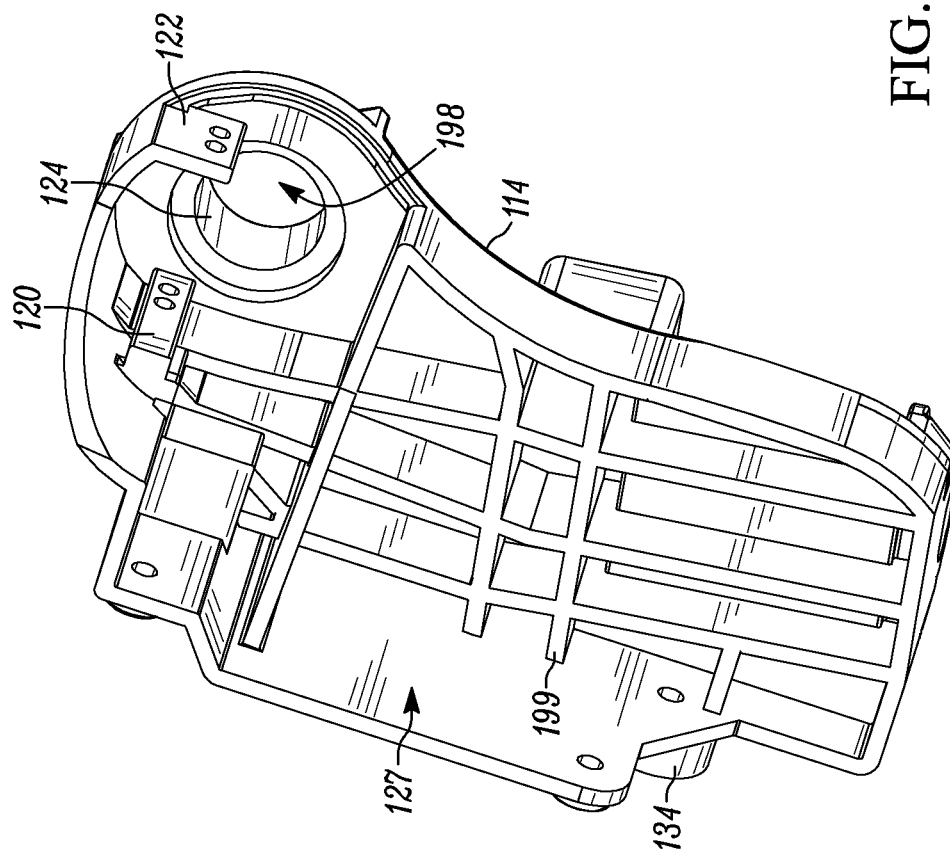


FIG. 21

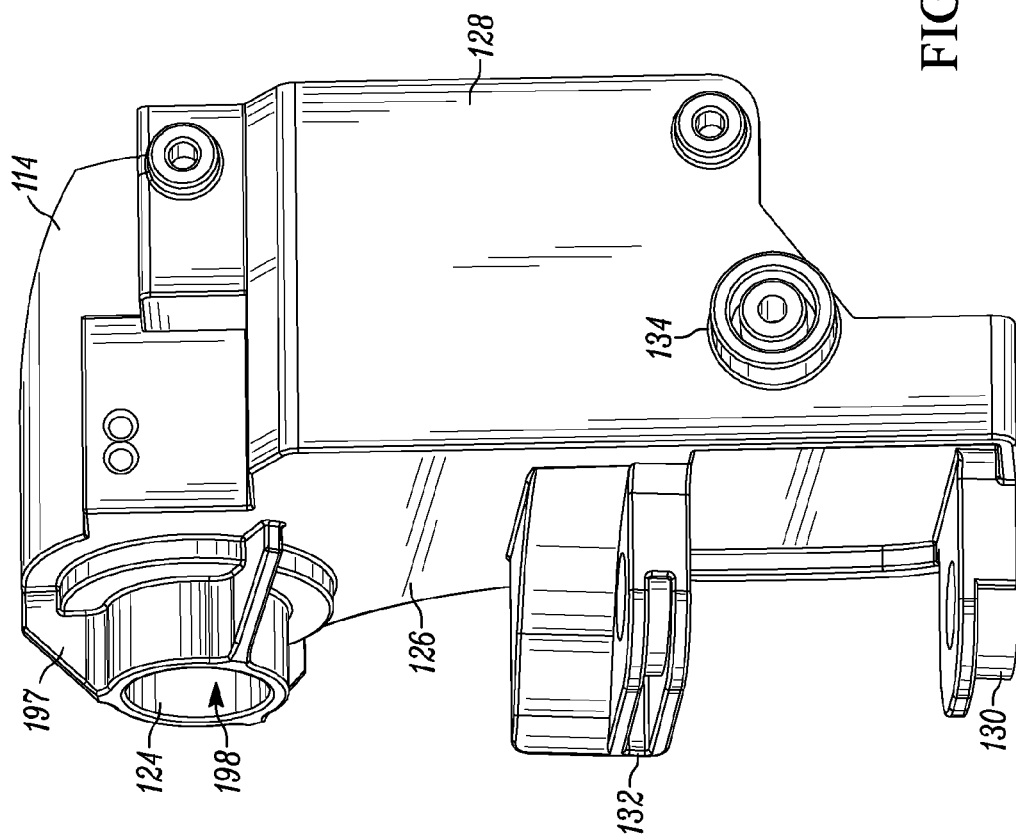


FIG. 22

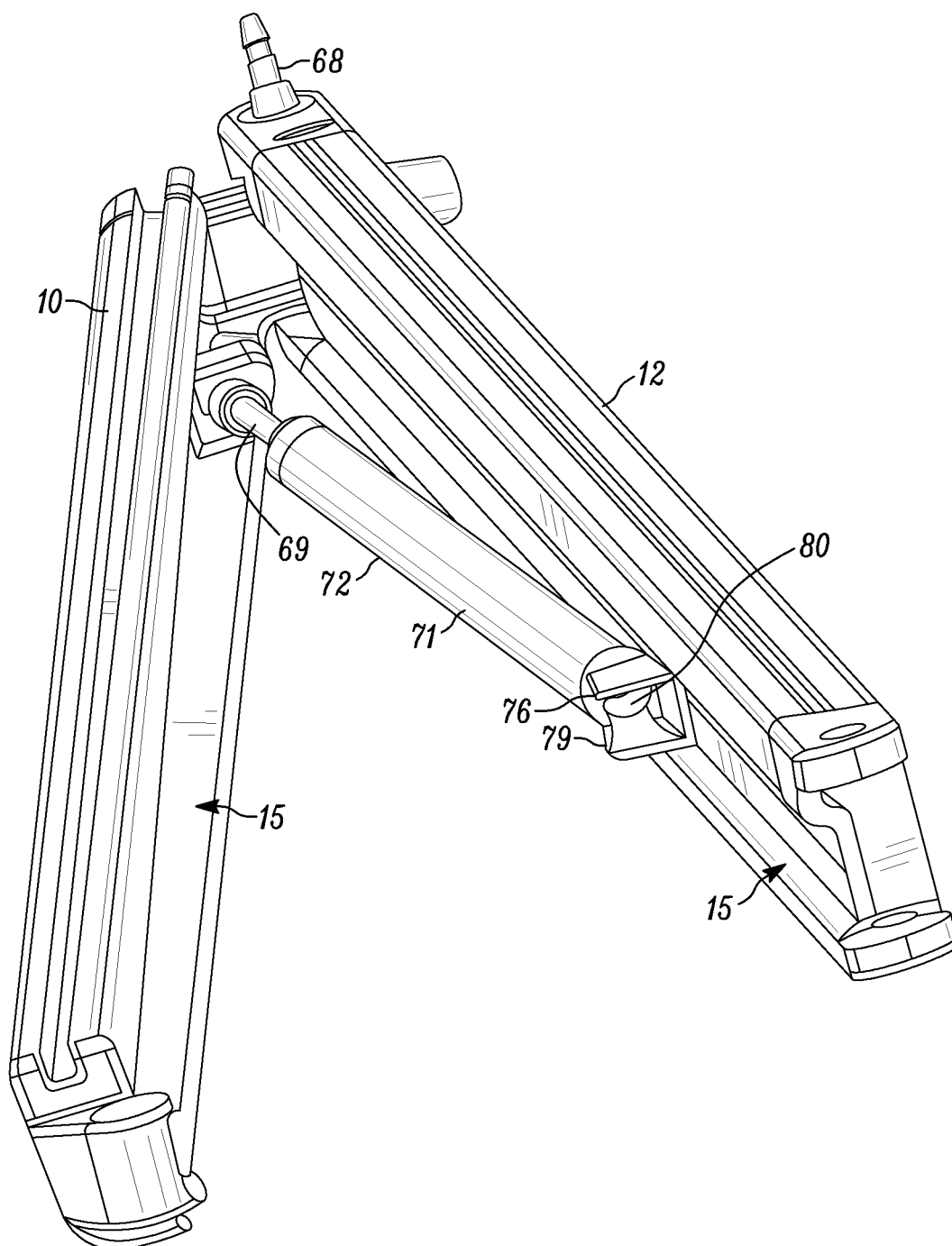


FIG. 23

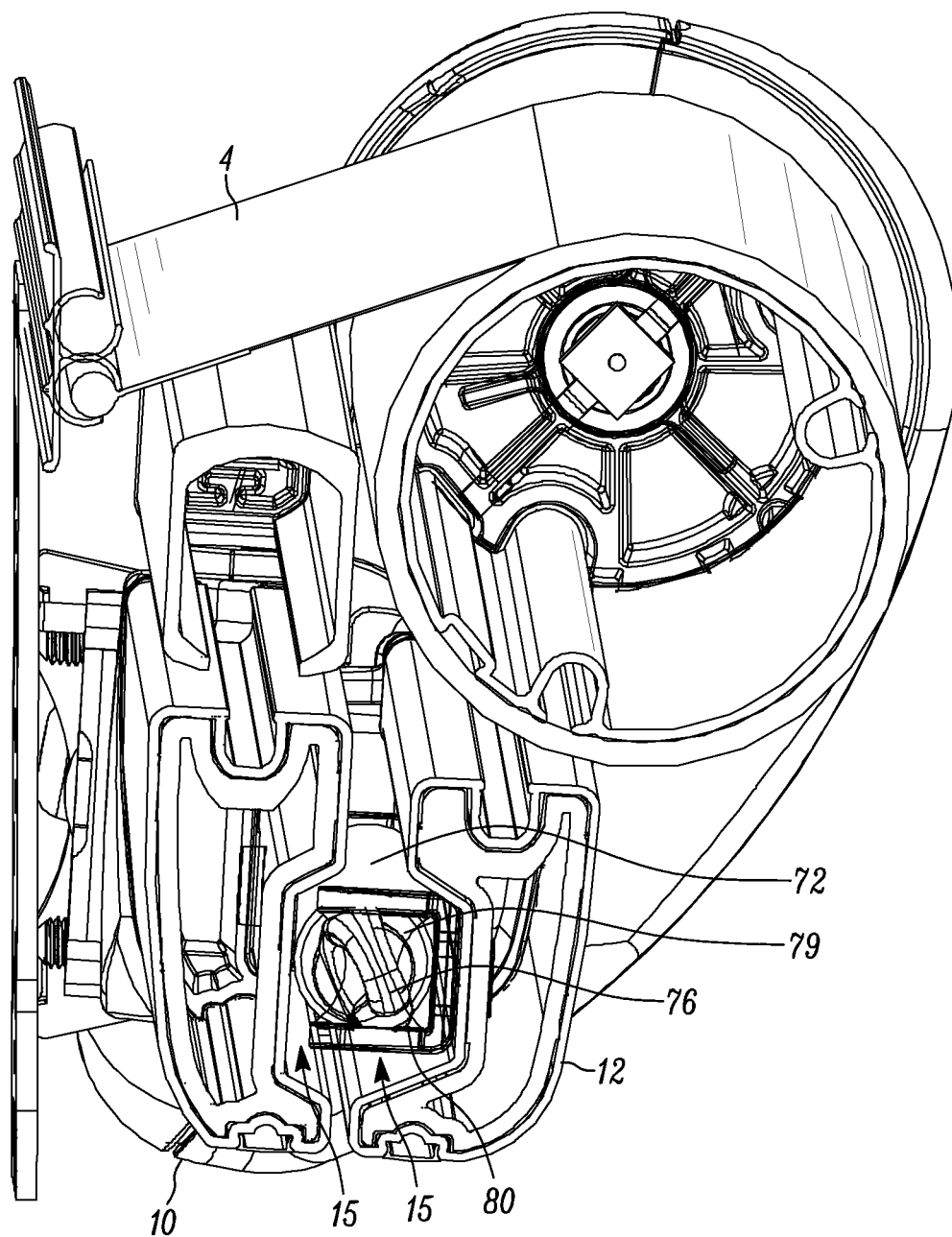


FIG. 24

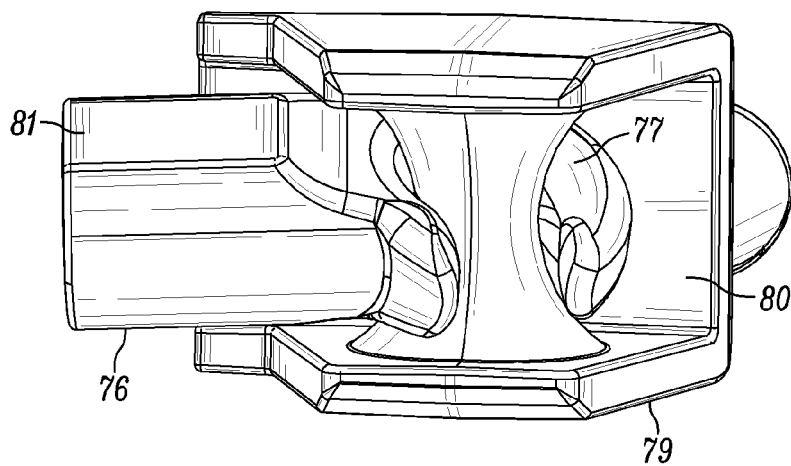


FIG. 25

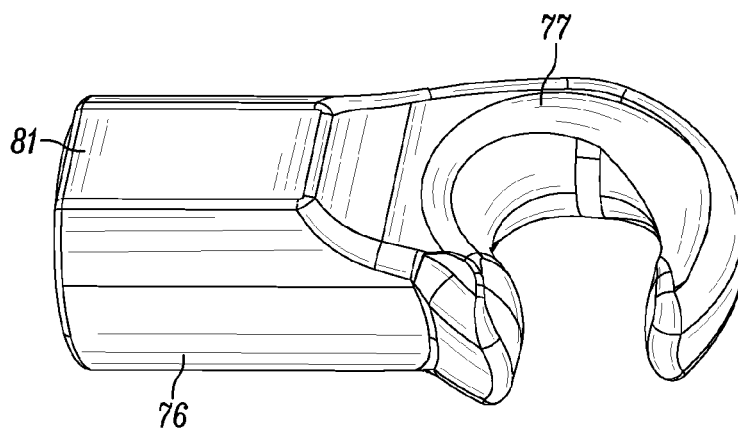


FIG. 26A

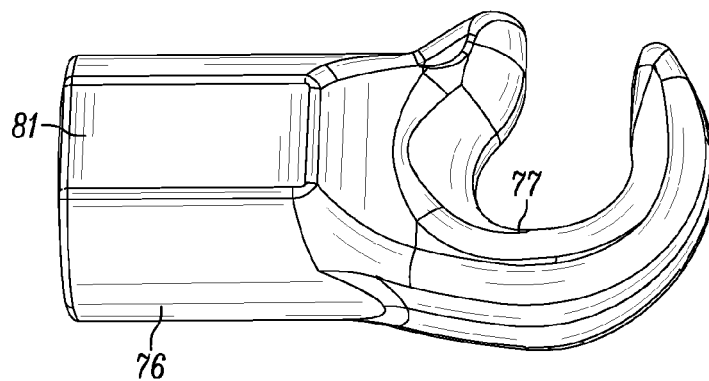


FIG. 26B



## LATERAL ARM AWNING SYSTEM AND METHOD OF OPERATION

### CROSS REFERENCES TO RELATED APPLICATIONS

The following application claims priority under 35 U.S.C. 119(e) to U.S. Provisional Patent Application Ser. No. 61/977,055 filed Apr. 8, 2014 entitled LATERAL ARM AWNING WITH LEAD RAIL ROLLER AND MOTOR and U.S. Provisional Patent Application Ser. No. 61/915,408 filed Dec. 12, 2013 entitled LATERAL ARM AWNING WITH LEAD RAIL ROLLER AND MOTOR. The above-identified applications from which priority is claimed are incorporated herein by reference in its entirety for all purposes.

### TECHNICAL FIELD

The present disclosure relates to a design and method of operation of a retractable roll-up awning, and more specifically, a lateral arm awning system.

### BACKGROUND

Many retractable awning systems, for example, as mounted on the sides of motor homes or over patios or windows, have a fabric canopy that is typically rolled or furled around a roller tube when not in use. The awnings have retraction systems that are actuated by a motor, a spring, or a manually operated gearbox to retract the awning. The roller tube may be connected to extension arms (or other extension structures) to extend and contract the arms while the roller tube is rotated by systems mentioned. The motor, spring, or manually operated gearbox is typically connected to the roller tube to rotate it in clockwise and/or counter-clockwise directions, thus operating to furl or unfurl the canopy around or from the roller tube.

There are typically two types of awning configurations: vertical arm awnings and lateral arm awnings. In vertical arm awning implementations, one edge of the canopy may be affixed to the wall of the motor home along a rail or within a storage box. A first end of each vertical arm is attached to a respective lateral end of the roller tube such that the roller tube can rotate with respect to the vertical arm. In some designs, the roller tube may be mounted within a roller housing that provides additional lateral structure rather than placing all the tension and compression forces on the roller tube. The opposite end of each vertical arm is mounted to the wall of the motor home, toward the base of the wall several feet underneath and just outside the lateral ends of the rail (or under the lateral ends of the storage box). When the awning is fully extended, the vertical arms extend at an angle upward and outward from the wall of the motor home to support the roller tube. The motor that drives the roller tube may be mounted to the first end of one of the vertical arms to interface with the spindle of the roller tube. This configuration of the motor is possible because the vertical arms act like struts with a vertical force resistance component that can support the significant weight of the motor and roller tube. One problem with this configuration is that the extended vertical arms interfere with users who must negotiate around the arms to enter under the awning from the sides. Another problem with this configuration is that there must be two unobstructed vertical spaces on the wall of the motor home for the vertical arms to mount to and collapse against when the awning is stowed. This may limit the size

of an available awning or limit the position of the awning on the side of the motor home to locations between windows or other obstructions.

Lateral arm awnings do not use vertical arm supports on the lateral ends of the awning. Instead, the lateral arms articulate from a folded position against the sidewall of the motor home to an extended position in the same plane that supports the extended canopy. However, the lateral arms are unable to support the weight of the roller tube and motor. Therefore, the roller tube and motor are mounted against the wall of the motor home, typically within a box or other housing. A lead rail is mounted to the distal ends of each of the lateral arms and a leading edge of the canopy is attached along the length of the lead rail. The lead rail is typically lightweight and does not need to resist significant tension or compression due to a vertical load because the edge of the canopy is lightweight. The lateral arms do exert a lateral tensile force on the lead rail which is more easily born. The benefit of lateral arm canopies is the unobstructed space under the awning as there are no vertical arms on each side. Further, installation is not impeded by structures on the sidewall of the motor home because the awning can be installed well above any windows or other structures. However, the box or housing and the lead rail translate into additional material and manufacturing costs not necessarily needed with a vertical arm awning.

The information included in this Background section of the specification, including any references cited herein and any description or discussion thereof, is included for technical reference purposes only and is not to be regarded subject matter by which the scope of the invention is to be bound.

### SUMMARY

One example embodiment of the present disclosure comprises a lateral arm assembly having first and second articulating arms comprising first and second ends, the first ends of the articulating arms are mounted upon assembly to a support surface at separate lateral locations. The first ends each comprise separate pivoting mounting structures for forming a first pivotal connection with the first and second articulating arms. The lateral arm assembly also comprises a roller tube having spaced lateral ends supporting respective end brackets that provide a second pivotal connection to the second ends of the articulating arms. The roller tube supports a canopy coupled to a roller shaft, wherein one of the end brackets further supports a device that drives the roller shaft for furling and unfurling the canopy.

Another example embodiment of the present disclosure comprises a method of operating a lateral arm awning assembly. The method comprises the steps of mounting to a support surface first ends of first and second articulating arms at separate lateral locations and providing separate pivoting mounting structures to the first ends of the first and second articulating arms. The pivoting mounting structures forming a first pivotal connection with the first and second articulating arms and the support surface. The method also comprises providing a roller tube having spaced lateral ends supporting respective end brackets, the end brackets providing a second pivotal connection to second ends of the first and second articulating arms and supporting a canopy with the roller tube and coupling the canopy to a roller shaft. The method further includes driving the roller shaft to furl and unfurl the canopy with a device that is supported by one of the end brackets.

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Yet another example embodiment of the present disclosure includes a lateral arm awning assembly comprising first and second articulating arms having first and second ends, the first ends of the articulating arms being mounted upon assembly to a support surface at separate lateral locations. The first ends each comprise separate pivoting mounting structures for forming a pivotally fixedly connection with the first and second articulating arms. The assembly also comprises a roller tube having spaced lateral ends supporting respective end brackets that provide a pivotally fixedly connection to the second ends of the first and second articulating arms. The roller tube supports a canopy coupled to a roller shaft, wherein one of the end brackets further supports a drive motor that drives the roller shaft for furling and unfurling the canopy. The canopy when in an unfurled position forms a plane such that the first and second articulating arms are disposed to remain substantially parallel with the plane during the operation of the awning assembly as the canopy extends from a furled to an unfurled position

#### BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other features and advantages of the present disclosure will become apparent to one skilled in the art to which the present invention relates upon consideration of the following description of the invention with reference to the accompanying drawings, wherein like reference numerals refer to like parts unless described otherwise throughout the drawings and in which:

FIG. 1 is an isometric view of a lateral arm awning in an extended position with the roller tube and motor mounted between the distal ends of the extended arms;

FIG. 2 is a left side elevation view of the lateral arm awning of FIG. 1 in a closed position;

FIG. 3 is a front left isometric view of a portion of the lateral arm awning of FIG. 1;

FIG. 4 is left rear isometric view of a portion of the lateral arm awning of FIG. 1;

FIG. 5 is front elevation view of a mounting plate used to mount the lateral arm awning of FIG. 1 to a surface;

FIG. 6A is a rear left isometric view of a mount block used to mount the lateral arm awning of FIG. 1 to the mount plate;

FIG. 6B is a top front isometric view of a pivot block that fixedly attaches to the mount block and pivotably attaches to a clevis extending from an arm of the lateral arm awning of FIG. 1;

FIG. 6C is a left rear isometric view of the pivot block of FIG. 6B;

FIG. 6D is a front isometric view in cross section of a portion of the pivot attachment of an extension arm of the lateral arm awning of FIG. 1 at the mounting plate;

FIG. 6E is a right side isometric view in cross section of a portion of the pivot attachment of an extension arm of the lateral arm awning of FIG. 1 at the mounting plate;

FIG. 6F is a left side isometric view in cross section of a portion of the pivot attachment of an extension arm of the lateral arm awning of FIG. 1 at the mounting plate;

FIG. 7 is a left side isometric view of the arm clevis that forms part of the pivot attachment of the lateral arm awning of FIG. 1;

FIG. 8 is a right side isometric view of a portion of the lateral arm awning of FIG. 1 depicting an arm elbow of a right side extension arm between proximal and distal sections of the right side extension arm;

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FIG. 9 is a right side isometric view of a portion of the lateral arm awning of FIG. 1 depicting an arm elbow of a left side extension arm between proximal and distal sections of the left side extension arm;

FIG. 10 is a bottom right isometric view of an alternate lateral arm awning having an intermediate canopy support;

FIG. 11 is a right side isometric view in partial cross section of a portion of the lateral arm awning of FIG. 10 depicting an arm elbow of a right side extension arm between proximal and distal sections of the right side extension arm and a connection between the arm elbow and the intermediate canopy support;

FIG. 12 is a right rear isometric view of a distal portion of the lateral arm awning of FIG. 1 depicting the distal end of the lateral arm awning;

FIG. 13 is a right side isometric view of a distal portion of the lateral arm awning of FIG. 1 with the right side roller cover removed;

FIG. 14 is a left front isometric view of a distal portion of the lateral arm awning of FIG. 1 with the right side roller cover removed;

FIG. 15 is a left rear isometric view of a right roller bracket from the lateral arm awning of FIG. 1;

FIG. 16 is a right front isometric view of the right roller bracket of FIG. 15;

FIG. 17 is a left front isometric view in partial cross section of a distal portion of the lateral arm awning of FIG. 1 with the right side roller cover removed;

FIG. 18 is a top left isometric view of an arm hinge that attaches the right distal arm section to the right roller bracket of the lateral arm awning of FIG. 1;

FIG. 19 is a right side isometric view of the arm hinge of FIG. 18;

FIG. 20 is a front left isometric view of a distal portion of the lateral arm awning of FIG. 1 with the left side roller cover removed;

FIG. 21 is a right rear isometric view of a left roller bracket from the lateral arm awning of FIG. 1;

FIG. 22 is a front isometric view of the left roller bracket of FIG. 21;

FIG. 23 is an isometric view of a gas spring connected between proximal and distal sections of an extension arm;

FIG. 24 is an isometric view in cross section of the lateral arm awning in a closed position enclosing the gas spring between proximal and distal sections of the right side extension arm;

FIG. 25 is an isometric view of a clip hand on an end of the gas spring attached to a spring post that mounts to a respective extension arm;

FIG. 26A is a top isometric view of the clip hand of FIG. 25; and

FIG. 26B is a bottom isometric view of the clip hand of FIG. 25.

Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to help to improve understanding of embodiments of the present disclosure.

The apparatus and method components have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the disclosure with details

that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

#### DETAILED DESCRIPTION

Referring now to the figures generally wherein like numbered features shown therein refer to like elements throughout unless otherwise noted. The present disclosure relates to a design and method of operation of a retractable roll-up awning, and more specifically, a lateral arm awning system.

One exemplary implementation of a lateral arm awning **2** is depicted in full in FIGS. **1** and **2**. The lateral arm awning assembly **2** is shown fully extended in FIG. **1** and fully retracted in FIG. **2**. The primary components of the lateral arm awning **2** as shown in FIG. **1** are a canopy **4**, a roller tube **6**, a canopy rail **8**, and lateral extension arms **10**. Each of the lateral extension arms **10** may be composed of two sections, a proximal arm **12** and a distal arm **14** joined together at an arm elbow **16**. A left roller cap **20** and a right roller cap **22** provide a link between the lateral ends of the roller **6** and the distal ends of the respective lateral extension arms **10**. When the canopy is in the extended position, it forms a plane P along an x axis and a y axis as illustrated in FIG. **1**. The plane P is framed by the lateral arms **12**, **14** about the sides and roller **6** and canopy rail **8** about its ends.

A pair of mounting plates **18** are connected, respectively, to the proximal ends of the extension arms **10** to support the awning **2** against a sidewall of a motor home, house, or other structure. The canopy rail **8** is likewise configured for attachment to the sidewall of a motor home, house, or other structure immediately above the mounting brackets **18**. The canopy rail **18** may extend the width of the canopy **4** or may be longer (or possibly shorter, although this is not preferred).

As shown in FIG. **2**, the proximal end of the canopy **2** may be connected to an attachment tab **26** that runs the width of the canopy **2**. The attachment tab **26** may be fixed to the proximal edge of the canopy **2** with adhesive, stitching, overmolding (if formed of a plastic material, or a combination of any of these or other known methods of attachment). The proximal edge of the attachment tab may be formed as a retention rod **28** that extends the width of the canopy **2**. The attachment tab **26** with retention rod **28**, and similarly the canopy rail **8**, may be formed monolithically as a plastic extrusion, a molded plastic piece, or of an extruded, lightweight metal (e.g., aluminum). The lower edge of the canopy rail **8** is formed as a tube **24** that also extends the width of the canopy **2**. The rail tube **24** further defines a linear slot **25** along the length of the rail tube **24**. The retention rod **28** may be cylindrical as shown or may have any other cross section that can fit within and be retained within the rail tube **24** and allow the canopy **4** to extend from the linear slot **25**. The rail tube **24** may similarly have any cross-sectional form as long as the retention rod **28** can fit therein.

The following discussion of the components and construction of the awning **2** focuses on the construction of a single arm **10** and the connections between the arm **10** and a wall or other surface at a first end and to the roller tube **6** at a second end. However, there are two arms **10** supporting the canopy **4** of the awning **2** mounted at two separate, respective locations on the support surface and connected to respective lateral ends of the roller tube **6**. Therefore, it should be apparent that when one structure of the arm **10** or a mounting or connection structure attached thereto is described, the same structure is found in the construction of both arms unless otherwise stated. The primary difference is

that the parts may either be flipped in orientation or manufactured to be of a symmetric form to the parts on the opposing arm **10**.

As shown particularly in FIGS. **3-5**, each of the mounting plates **18** may be formed of a sheet of steel sufficiently thick (e.g., one-tenth of one inch (0.1") to one-quarter of one inch (0.25")) to structurally support the weight of the awning **2**, both when stowed and extended, and further to support the awning **2** when additional forces act upon the awning **2**, for example, wind gusts or rain or snow load. As shown in the figures, the mounting plate **18** may be formed in the shape of a parallelogram with additional tabs extending from the two upper and lower corners of the furthest lateral extension of the parallelogram. The shape of the mounting plate **18** may be varied depending upon various factors including, for example, the projected load; the available size, shape, or form of the surface area for attachment on the wall; or others. A number of mounting holes **52** may be formed throughout the mounting plate **18** for use with lag bolts or other bolts to attach the mounting plate **18** to the wall. In the exemplary embodiment shown, there are four mounting holes **52** spaced evenly apart along each of the top and bottom edges of the mounting plate **18** with four of the mounting holes **52** located in the respective corners of the mounting plate **18**. Additional mounting holes **52** may be formed in other locations within the mounting plate **18** and other arrangements of mounting holes **52** are possible.

A number of block screw apertures **48, 48'** may be formed in the mounting plate **18**. In the embodiment shown, the block screw apertures **48, 48'** are arranged in two sets of three in triangular patterns. It may be noted that the mounting plate **18** is designed to be reversible such that the same form of the mounting plate can be used on each side of the awning **2** in a reverse orientation. The block screw apertures **48, 48'** may be conically beveled with the bevels of one set of block screw apertures **48** formed on a first side of the mounting plate **18** and the other set of block screw apertures **48'** formed on the opposite side of the mounting plate **18**. The block screw apertures **48, 48'** may be beveled to accept bevel-headed screws used to attach the extension arms **10** to the mounting plate **18** such that the heads of the screws are flush with the back surface of the mounting plate **18** when it is placed against a wall.

As shown in greater detail in FIGS. **3, 6A-6E**, and **7**, the extension arms **10** are attached to the mounting plates **18** via a pivoting mounting hinge structure **31** composed primarily of a mount block **32**, a pivot block **34**, and an arm clevis **44**. It may be appreciated that both the mount block **32** and pivot block **34** are designed such that they can be used on either side of the awning **2** merely by flipping the orientation of the components 180 degrees. As shown in FIG. **6A**, the mount block **32** is formed from a solid block of rigid material (e.g., aluminum) and machined to define a number of features. The back surface may be formed as an arcuate bridge **142** terminating at each end in at a foot **140** that interfaces with the mounting plate **18**. Each foot **140** may be define a recessed channel **138a/b** such that an outer foot **140a** and an inner foot **140b** bound each channel **138a/b**. Three threaded blind holes **136a/b/c** may be formed within the channels **138a/b**, two in an upper channel **138a** and one in a lower channel **138b**. The threaded blind holes **136a/b/c** may be arranged to align with the block screw apertures **48** in the mounting plate **18** such that the beveled set screws described above may be screwed into the threaded blind holes **136a/b/c** to attach the mounting plate **8** to the mount block **32**. A larger lateral bore hole **144** may be formed between the lateral sides of the mount block **32**. Two additional threaded

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set-off bore holes **146a/b** may be formed laterally through the mount block **32** above and below the bore hole **144**.

As shown in FIGS. 6B and 6C, the pivot block **34** may be similarly formed of a solid block of rigid material (e.g., aluminum) and machined to define a number of features. A body portion **152** of the pivot block **34** may be generally formed as a rectangular cuboid that extends to one lateral side and transitions through top and bottom steps to form a pivot knuckle **154** of a shorter longitudinal length than the body portion **152**. The pivot knuckle **154** defines a longitudinal barrel hole **156** therethrough. A set screw bore **158** may be defined within a wall forming the pivot knuckle **154** through to the barrel hole **156**. The body portion **152** defines a generally cuboid cavity **36** from open to both the front and back of the pivot block **34**. A lateral cylindrical pivot block bore **148** extends through the lateral side of the body portion **152** opposite the pivot knuckle **154** to connect with the cavity **36**. Upper and lower threaded angular position bores **150a/b** are formed in the body portion **152** above and below the height of the cavity **36**. Angle adjustment screws **42a/b** are positioned within the angular position bores **150a/b**. A set-off pin **160** may be seated in a blind hole and extend from a back surface of the body portion **152** adjacent the upper angular position bore **150a**. A rectangular channel **162** may further be defined along the length of the lateral side of the body portion **152** opposite the pivot knuckle **154** such that the opening to the pivot block bore **148** is recessed in the channel **162**. As shown, a rectangular washer **162** defining a hole corresponding to the pivot block bore **148** may be placed and retained within the channel **162**.

The mount block **32** and the pivot block **34** may be attached together as shown in FIG. 6D. The pivot block **34** and washer **164** may be placed adjacent the right side of the mount block **32** after the mount block **32** is attached to the mounting plate **18**. The pivot block bore **148** is aligned with the bore hole **144** in the mount block **32**. A mount bolt **38** is placed through the bore hole **144** and extends through the pivot block hole **148** and into the cavity **36**. A mount nut **40** is positioned in the cavity **36** to receive the threaded end of the mount bolt **38**. The cubic configuration of the cavity **36** prevents the mount nut **40** from turning while the mount bolt **38** is tightened to affix the pivot block **34** to the mount block **32**. During this mounting process, the set-off screws **166a/b** within the set-off bores **146a/b** in the mount block **32** may be adjusted to change a set-off distance between the pivot block **34** and the mount block **32**. The rectangular washer **164** may provide a harder surface than the material of the pivot block **34** to resist the point pressure exerted by the set-off screws **166a/b** when the mount bolt **38** is tightened.

It may be desirable to adjust the separation distance between the mount block **32** and the pivot block **34** in order to fine tune the separation distance of the arms **10** of the awning **2** at the wall. The set-off screws **166a/b** may also be extended or retracted independently to adjust the roll of the arms **10** with respect to a vertical plane to ensure the roller tube **6** at the opposite ends of the arms **10** is substantially horizontal. Similarly, the angle adjustment screws **42a/b** in the pivot block **34** may extend through the angular position bores **150a/b** in the pivot block **34** to contact a front surface of the mounting plate **18**. The angle adjustment screws **42a/b** may be extended or retracted independently to adjust the pitch of the arms **10** with respect to a horizontal plane as shown in FIG. 7 to provide an appropriate pitch to canopy **4** to ensure appropriate water drainage from the canopy **4**. These roll and pitch adjustments can be made after the awning **2** is fully assembled, allowing for movement between the pivot block **34** and the mount block **32** during

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such adjustments. The pin **160** may be provided on the back of the pivot block **34**, which serves to limit the upper (flattest) pitch adjustment setting to a minimal positive angle, thus preventing a negative pitch angle setting that may result in trapping moisture or rain. The pivot block **34** is pivotably connected to the arm clevis **44** that is further attached to the proximal arm **12** as shown in FIGS. 6D, 6E and 7. The arm clevis **44** is formed with an upper prong **168** and a lower prong **170** that each extend outward from a head portion **176** of the arm clevis **44**. The upper and lower prongs **168**, **170** have opposing planar surfaces that are separated from each other by a distance slightly greater than the length of the pivot block knuckle **154** such that the knuckle **154** can fit between the upper and lower prongs **168**, **170**. The upper prong **168** defines an upper prong aperture **172** therethrough, and the lower prong **168** defines a lower prong aperture **174** therethrough. The upper and lower prong apertures **172**, **174** are further sized to have a similar or slightly larger diameter as the knuckle barrel **256** and positioned to axially align with the knuckle barrel **256** in the pivot block **34**.

As shown in FIG. 6E, as pivot block pin **54** may be placed through each of the upper prong aperture **172**, the knuckle barrel **256**, and the lower prong aperture **174** to thereby join the pivot block **34** to the clevis **44** in a hinge. Two cylindrical bearing races **64a/b** may be placed within respective upper and lower prong apertures **172**, **174** and the pivot block pin **54** may be inserted through the bearings **64a/b** as well. The bearings **64a/b** may be in a race in the form of needle bearings, ball bearings, or any other effective bearing structure. The pivot block pin **54** may define an annular recess **60** about the median of the pivot block pin **54**. The base of the annular recess **60** may be splined. The annular recess **60** of the pivot block pin **54** may be aligned with the set screw bore **158** in the sidewall of the pivot block knuckle **154** and the set screw **62** may be advanced through the set screw bore **158** to interface with the annular recess **60** to hold the pivot block pin **54** in place and prevent it from falling out of the knuckle barrel **156** and the upper and lower prongs **168**, **170** of the clevis **44**. The arm clevis **44** may therefore rotate on the pivot block pin **54** with respect to the pivot block **34**. It should be noted that in other embodiments, the pivot hinge could be attached to the proximal arm and the clevis could be formed on the pivot block to achieve the same result.

As noted, the extension arms **10** may be composed of a proximal arm **12** and a distal arm **14** pivotally joined together at an arm elbow **16**. As shown in FIG. 7, an insert portion **178** of the arm clevis **44** extending from the head portion **176** of the arm clevis **44** may have a smaller outer form factor than the head portion **176**. The proximal end of the proximal arm **12** is joined to the arm clevis **44** by sleeving over the insert portion **178** of the arm clevis **44** and abutting against the larger form factor head portion **176**. The proximal arm **12** may further be affixed to the arm clevis **44** once sleeved over with screws, bolts, rivets, or other fasteners to hold the two together. A distal arm clip **46** may be mounted to and extend from a surface of the arm clevis **44** as shown in FIGS. 3, 6E, and 6F to interface with, position, and align the distal arm **14** with respect to the proximal arm **14** when the arms **10** are collapsed and the awning **2** is in a stowed position as shown in FIG. 2.

As indicated in FIG. 2, the arms **10** may fold together to stow the roller tube **6** with the furled canopy **4** against the wall or other mounting surface. This is a desirable configuration of the awning **2** in certain situations, e.g., for travel when attached to a motor home or to prevent damage due to forces from high winds or snow load impacting the canopy

4. As shown in FIGS. 2 and 8, when the awning is in an extended position, the extension arms 10 extend outward from the wall or other mounting surface. The proximal and distal arms 12, 14 rotate with respect to each other at the arm elbows 16 such that each proximal arm 12 is closer to being axially aligned with its respective distal arm 14 rather than each set of proximal and distal arms 12, 14 being substantially parallel and adjacent to each other when the awning 2 is in the stowed position.

The arm elbows 16 indicate pivot joints between the proximal arms 12 and the distal arms 14. As shown in FIGS. 8 and 9, the distal end of the proximal arm 12 may sleeve over an elbow clevis 58, which is substantially similar in structure to the arm clevis 44 on the proximal end of the proximal arm 12, although the actual form factor of the elbow clevis 58 may be different than that of the arm clevis 44. An elbow pivot 56 may extend from the proximal end of the distal arm 14. The structure of the elbow pivot 56 may be understood as a cross between the structure of the pivot block 34 (specifically the knuckle portion thereof) and the arm clevis 44 (particularly the insert portion thereof). An elbow pivot knuckle 180 of the elbow pivot 56 fits between an upper elbow prong 182 and a lower elbow prong 184 of the elbow clevis 56 and an elbow pin 66 runs through the respective barrel and apertures in each to form a hinge joint between the proximal arm 12 and the distal arm 14. Cylindrical bearing races may line the apertures of the upper elbow prong 182 and a lower elbow prong 184 to provide a low friction interface with the elbow pin 66. The elbow pin 66 may be similar to the pivot block pin 54 and define an annular recess or channel that interfaces with a set screw emerging from a bore in the elbow pivot knuckle 180 to retain the elbow pin 66 therein. It should be understood that in other embodiments, an elbow pivot could be attached to the proximal arm and the clevis could be formed on the distal arm to achieve the same result.

However, the elbow pin 66 may be formed differently than the pivot block pin 54 to extend out of the hole in the upper prong 182 of the elbow clevis 58. As shown in FIG. 8, the extended portion of the elbow pin 66 is covered by a pin cap 68 that pushes the canopy 4 above and away from the elbow joint 16 to prevent the material of the canopy 4 from being caught with the elbow joint 16. The pin cap 68 also provides a tear-resistant interface with the material of the canopy 4 as it unfurls and furls and the arms articulate underneath the canopy 4 back and forth between stowed and extended positions.

The right and left pivoting mounting hinge structures 31 provide a first pivotal connection with the proximal arms 12 of the lateral arms. This first pivotal connection is fixedly pivotally connects the lateral arms to their respective pivoting mounting hinge structure 31. State another way, the fixedly pivotally connection allows for only rotational movement, but does not allow for the translation of the proximal arms 12 when the canopy 4 is being extended or in an unfurled position (see FIG. 1) or when in the furled or retracted position (see FIG. 2).

In an alternate example embodiment shown in FIGS. 10 and 11, the awning 2' includes a mid-rail support 82 that is essentially a bar that extends underneath and supports the canopy 4' at a position halfway between the support surface and the roller tube 6. In this embodiment, the elbow pin cap 66 on top of the elbow pin 66 is replaced with a mid-rail guide 68' that similarly is affixed atop the elbow pin 66. However, the mid-rail guide 68' may be designed to fit within a channel 73 defined within and along the length of the mid-rail guide 82. The elbow pin 66 may extend through

a slot 75 running the length of the mid-rail guide 82 that opens in to the channel 73. The mid-rail guide 68' may be formed of a rigid material with low surface friction such that the mid-rail guide 68' may easily slide within and along a length of the channel 73 in the mid-rail support 82 as the extension arms 10 articulate between open and stowed positions of the awning 2'.

An elbow bumper 70 may be affixed to an inside surface of the elbow clevis 58 to provide a set-off between the proximal arm 12 and the support surface when the awning 2 is in the stowed position. The elbow bumper 70 may be made of plastic, rubber, or an elastomeric material to dampen the mechanical interaction between the extended arms 10 and the wall or other support structure when the awning 2 is stowed.

In the illustrated example embodiment of FIG. 9, the pin cap 68 resides on the end of the elbow pin 66. The pin cap 68 is further captured behind the roller 6 when in the furled position in order to drive the elbow bumper 70 tight against the mounted structure S. The bumper 70 is located at such position in order to properly secure the unsupported elbow end of the arm when the awning 2 is in the furled position and to provide stationary support during transit of the recreational vehicle.

As shown in FIGS. 8 and 23, opposing ends of a gas spring 72 may be affixed to the distal arm 14 and the proximal arm 12, of each of the extended arms 10, respectively. A proximal clip 74 on a first end of the gas spring 72 may connect with a proximal support 78 provided at an intermediate location along the length of the proximal arm 12. Likewise, a distal clip 76 on an opposite end of the gas spring 72 may connect with a distal support 80 provided at an intermediate location along the length of the distal arm 14. The gas springs 72 may provide tension on the roller tube 6 as it unfurls and furls the canopy 4 under the direction of a motor in to ensure the canopy 4 remains taught.

The proximal and distal supports 78, 80 may define a spring post 79 to which the proximal and distal clips 74, 76 attach. The spring post 79 may be shaped similar to an hourglass as shown in greater detail in FIG. 25 in order to aid in the attachment of the clips 74, 76. As shown in FIGS. 26A and 26B, a grasping portion 77 of the clips 74, 76 may be shaped in the form of a "C" or a cupped hand with a "thumb" and a curled "finger" extending from a cylindrical wrist 81 that attaches to either the piston 69 or the tube 71 of the gas springs 72. Each side, as well as the inner wall of the C-shaped grasping portion 77 of the clips 74, 76 is contoured to allow the clips 74, 76 to fit between the post 79 and a mounting wall of the supports 78, 80 and curve around the post 79 to attach thereto. The clips 74, 76 may be formed of a strong molded plastic that has a sufficient elastic modulus to provide slight flexibility to allow the clips 74, 76 to easily pop on and off of the posts 79, but to remain firmly in place when the awning is maintained under tension by the canopy 4. In some embodiments, the elbow pin 66 may be easily removable from the elbows 16 to allow the extension arms 10 to collapse and remove the force of the canopy 4 in order to more easily remove and replace the gas springs 72.

Additionally, as shown in FIGS. 23 and 24, when the extension arms 10 are retracted and the canopy 4 is furled, the gas springs 72 may nest within channels 15 formed in the proximal and distal arms 12, 14. The proximal and distal arms 12, 14 may be formed as monocoque structures that in the illustrated example embodiment of FIG. 24 comprise tubes of extruded aluminum having a central cavity strengthened a plurality of sidewalls, wherein one sidewall defining an inner recess forming the channels 15 along the length of

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the one sidewall. The outer surfaces of the proximal and distal arms **12**, **14** thus form C-shaped perimeters in cross section as can be seen in FIG. **24**. In this design, the gas springs **72** are concealed within the opposing channels **15** of the proximal and distal arms **12**, **14** when the awning **2** is retracted as shown in FIG. **24**, which provides for a sleek and compact form.

Attachment between the distal arms **14** and the roller tube **6**, and the structures supporting such attachment, is shown in greater detail in FIGS. **12-22**. In particular, FIGS. **12-19** depict the right roller cap **22** and associated attachment structures between the right side of the roller tube **6** and the respective distal arm **14**, which, is slightly different than the left roller cap **20** and associated attachment structures between the left side of the roller tube **6** and the respective distal arm **14** because the right side houses and supports a drive motor **84**. To this end, the right end cover **83** may be larger and of a different form factor than the left end cover **85** in order to accommodate the motor **84** and system controller hardware **86**.

The motor **84**, system controller hardware **86**, and a gear housing **188** are all mounted to a right roller bracket **88** that also pivotably connects with the extension arms **10** and rotationally connects with the roller tube **6**, thereby supporting the roller tube **6** and the motor on the distal end of the extension arm **10** while still allowing the extension arm **10** to articulate. The right roller bracket **88** is depicted in greater detail in FIGS. **15** and **16**. The right roller bracket **88** may be a cast metal piece, e.g., of cast aluminum, steel, or other material, able to provide the necessary hardness and tensile strength to support the roller tube **6** and motor **84** on the end of the extension arm **10**. The inner wall **186** and back facing wall **190** of the right roller bracket **88** that are adjacent to the roller tube **6** and canopy **4** may have smooth surfaces in order to minimize the possibility of interference with the operation of the roller tube **6** or the material of the canopy **4**. The form factor of these walls **186**, **190** may be designed in any desirable way in order to accommodate the form and size of the motor **84** and gear housing **188** and other components related to the drive system for the roller tube **6**. The back facing wall **190** may be formed with a bumper receptacle **100** (among other features) for connection of a lateral bumper **30** to provide a set-off between the right roller cap **22** and the support surface when the awning is in the stowed position. The inner wall **186** may be generally flat with several protrusions extending therefrom toward the roller tube including a cylindrical axle journal **98**, a lower clevis mount **90** and an upper clevis mount **92**.

The right and left roller brackets **88**, **114**, respectively provide a second pivotal connection with the distal arms **14** of the lateral arms. This second pivotal connection is fixedly pivotally connects the lateral arms to their respective brackets **88**, **114**. State another way, the fixedly pivotally connection allows for only rotational movement, but does not allow for the translation of the distal arms **14** when the canopy **4** is being extended or in an unfurled position (see FIG. **1**) or when in the furled or retracted position (see FIG. **2**).

While the right roller bracket **88** houses the drive motor **84**, it should be appreciated that other energizing or mobility devices **101** could be used to advance the roller tube **6**, canopy **4**, and lateral arms **12**, **14** away from the sidewall or support structure **S** (see FIG. **2**). For example, the right roller bracket **88** in one example embodiment contains a device **101** such as a torsion spring or manual gear box.

The axle journal **98** may be further reinforced with counterforts **99** or other external rib structures extending between the inner wall **186** and the exterior wall of the axle

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journal **98**. The axle journal **98** further defines an aperture **192** that extends therethrough and further through the inner wall **186** to an outer side **187** of the right roller bracket **88** where the motor **84** is attached. A shaft of the right side of the roller tube **6** may seat within and be supported by the axle journal **98**. The outer side **187** may be reinforced with a number of ribs **194** extending normally therefrom to add strength to the right roller bracket **88** so that the walls **186**, **190** can be formed relatively thin, thereby reducing the weight that must be supported by the arms **10** and the mounting plates **18** on the mounting surface. There can be any number of ribs **194** of varying lengths, widths, and thicknesses, arranged in any order or position as desired or designed to appropriately strengthen the right roller mount **88** for the loads and stresses that it needs to accommodate. The right roller mount **88** may further define a number of motor mounts **96a/b/c** aligned with corresponding attachment structures on the motor **84** and the gear housing **188**. The motor mounts **96a/b/c** may define threaded boreholes that receive bolts to attach the motor **84** and the gear housing **188** to the right roller mount **88**. In other embodiments the boreholes in the motor mounts **96a/b/c** may not be threaded and the bolts can merely be attached with nuts either adjacent to the inner wall **186** or adjacent to the motor **84** depending upon which direction a bolt is inserted.

The lower and upper clevis mounts **90**, **92** may be similar in form to the prongs extending from the arm clevis **44** and the elbow clevis **58**. However, the orientation of the lower and upper clevis mounts **90**, **92** is normal to the face of the inner wall **186**. As shown in FIGS. **12**, **13**, and **17**, an arm hinge **94a** is attached to the distal end of the distal arm **14**. The distal arm **14** may sleeve over an insert portion **112** of the arm hinge **94**. As shown in FIGS. **18** and **19**, a hinge knuckle **112** defining a hinge barrel **110** extends from the insert portion **112** of the arm hinge **94a** at an obtuse angle with respect to the longitude of the insert portion **112** and, consequently, with respect to the longitude of the distal arm **14**. This angular orientation allows the arm hinge **94a** to more easily interface with the lower and upper clevis mounts **90**, **92** extending from the inner wall **186**.

The hinge knuckle **112** of the arm hinge **94a** is pivotably connected to the lower and upper clevis mounts **90**, **92** in substantially the same manner as the arm clevis **44** attaches to the pivot block **34**. A hinge knuckle **108** fits between the lower and upper clevis mounts **90**, **92** and an arm pin **102** runs through the hinge barrel **110** and apertures in each of the lower and upper clevis mounts **90**, **92** to form a hinge joint between the distal arm **14** and the right roller bracket **88**. Cylindrical bearing races **106a/b** may line the apertures of the lower and upper clevis mounts **90**, **92** to provide a low friction interface with the arm pin **102**. The arm pin **102** may be similar to the pivot block pin **54** and define an annular recess **104** or channel that interfaces with a set screw **196** emerging from a bore in the elbow pivot knuckle **180** to retain the elbow pin **66** therein. It should be understood that in other embodiments, a hinge knuckle could be attached to the inner wall **186** of the right roller bracket **88** and the clevis could be formed on the arm hinge extending from the distal arm **14** to achieve the same result.

A left roller cap **20** as depicted, for example, in FIG. **2** with associated attachment structures, shown in greater detail in FIGS. **20-22** is similar in many respects to structures in the right roller cap **22** previously described. The left end cover **85** is removed in FIG. **20** to reveal a left roller bracket **114**, which is similar in structure to the right roller bracket **88** except that it does not need to support a motor. The left roller bracket **114** may be a cast metal piece, e.g.,

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of cast aluminum, steel, or other material, able to provide the necessary hardness and tensile strength to support the roller tube 6 and motor 84 on the end of the extension arm 10. An inner wall 126 and back facing wall 128 of the left roller bracket 114 that are adjacent to the roller tube 6 and canopy 4 may have smooth surfaces in order to minimize the possibility of interference with the operation of the roller tube 6 or the material of the canopy 4. The form factor of these walls 126, 128 may be designed in any desirable way in order to accommodate the form and size of the other components related to the mounting system for the roller tube 6. The back facing wall 128 may be formed with a bumper receptacle 134 as illustrated in FIGS. 21 and 22 (among other features) for connection of a lateral bumper 30 to provide a set-off between the left roller cap 22 and the support surface when the awning 2 is in the stowed position. The inner wall 126 may be generally flat with several protrusions extending therefrom toward the roller tube including a cylindrical axle journal 124, a lower clevis mount 130 and an upper clevis mount 132.

The axle journal 124 may be further reinforced with counterforts 197 or other external rib structures extending between the inner wall 126 and the exterior wall of the axle journal 124. The axle journal 124 further defines an aperture 198 that extends therethrough and further through the inner wall 126 to an outer side 127 of the left roller bracket 114. A shaft 116 of the left end of the roller tube 6 may seat within and be supported by the axle journal 124. The outer side 127 may be reinforced with a number of ribs 199 extending normally therefrom to add strength to the left roller bracket 114 so that the walls 126, 128 can be formed relatively thin, thereby reducing the weight that must be supported by the arms 10 and the mounting plates 18 on the mounting surface. There can be any number of ribs 199 of varying lengths, widths, and thicknesses, arranged in any order or position as desired or designed to appropriately strengthen the left roller mount 114 for the loads and stresses that it needs to accommodate.

A top portion of the outer side 127 may be formed with a proximal cotter support 120 and a distal cotter support 122 positioned across at least a portion of the aperture 198 of the axle journal 124, with one of the supports 120, 122 on either side of the aperture 198. Each of the proximal cotter support 120 and the distal cotter support 122 define a pair of apertures for receipt of a corresponding pair of cotter pins 118 or other similar pin or rod. The cotter pins 118 may be inserted through the cotter supports 120, 120 during assembly and optionally for shipping to maintain a tight interface with the shaft 116 of the roller tube 6. This prevents the roller tube 6 from sliding axially within the axle journal 124 during assembly in order to easily adjust the components of the awning 2 to proper positions and tolerances. When the cotter pins 118 are removed for operation, the additional space or "slop" around the shaft 116 allows the roller tube 6 room to expand and contract axially in response to weather conditions (i.e., heat and cold). In addition, the cotter pins 118 prevent undue stress and resultant binding of the arms 12, 14 and roller tube 6 during operation of the awning 2.

The lower and upper clevis mounts 130, 132 may be similar in form to the lower and upper clevis mounts 90, 92 on the right roller bracket 88 normal to the face of the inner wall 126. An arm hinge 94b is attached to the distal end of the distal arm 14 and is substantially the same as the arm hinge 94a that attaches to the right roller bracket 88, but is formed as a mirror opposite thereof. The distal arm 14 may sleeve over an insert portion of the arm hinge 94b. The hinge knuckle of the arm hinge 94b is pivotably connected to the

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lower and upper clevis mounts 130, 132 in substantially the same manner as with respect to the right roller bracket 88, including the pin and bearing arrangements. It should be understood that in other embodiments, a hinge knuckle could be attached to the inner wall 126 of the left roller bracket 114 and the clevis could be formed on the arm hinge extending from the distal arm 14 to achieve the same result.

This unique structural design combining of the separate mounting plates 18 for attachment to the motor home wall or other mounting surface and the mount block 32 and pivot block 34 at the proximal end of the awning, and the left and right roller brackets 88, 124 that support the roller tube 6 and the motor 84 at the distal end, which further allow the articulating lateral arms to pivotably connect to the roller tube 6, provide for a new lateral arm awning with the motor and roller mounted at the distal end. This achieves many advantages, including a reduction in parts and materials needed to build the awning, and thereby a reduction in cost and avoids the problems associated with vertical arm awnings noted previously, which heretofore were the only design known in which the motor and roller tube could be mounted on a distal end of an awning.

Although various embodiments of this invention have been described above with a certain degree of particularity, or with reference to one or more individual embodiments, those skilled in the art could make numerous alterations to the disclosed embodiments without departing from the spirit or scope of this invention. All directional references (e.g., proximal, distal, upper, lower, upward, downward, left, right, lateral, front, back, top, bottom, above, below, vertical, horizontal, clockwise, and counterclockwise) are only used for identification purposes to aid the reader's understanding of the present invention, and do not create limitations, particularly as to the position, orientation, or use of the invention. Connection references (e.g., attached, coupled, connected, and joined) are to be construed broadly and may include intermediate members between a collection of elements and relative movement between elements unless otherwise indicated. As such, connection references do not necessarily infer that two elements are directly connected and in fixed relation to each other. It is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative only and not limiting. Changes in detail or structure may be made without departing from the basic elements of the invention as defined in the following claims.

The awning assembly 2 illustrated in the figures and described in the above example embodiments advantageously eliminates typical construction elements that significantly contribute to higher cost. For example, by positioning the drive motor 84 on the roller tube 6 at the distal end of the awning arms 12, 14, the lead rail of conventional awning assemblies is eliminated. As well, conventional aluminum housing or boxes that support the canopy along the structural or sidewall of the house or motor home can also be eliminated. Since the canopy 4 is retracted from the roll tube 6 as it moves away from the sidewall, only a modest extrusion is needed by way of the canopy rail 8 and its rail tube 24 that allows the canopy 4 to be conveniently slipped into location during its initial assembly. Thus, this compact awning assembly 2 design eliminates bulky housings, large support structures of conventional awning systems found on the sidewalls, and their associated cost.

In the foregoing specification, specific embodiments have been described. However, one of ordinary skill in the art appreciates that various modifications and changes can be made without departing from the scope of the disclosure as

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set forth in the claims below. Accordingly, the specification and figures are to be regarded in an illustrative rather than a restrictive sense, and all such modifications are intended to be included within the scope of present teachings.

The benefits, advantages, solutions to problems, and any element(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential features or elements of any or all the claims. The disclosure is defined solely by the appended claims including any amendments made during the pendency of this application and all equivalents of those claims as issued.

Moreover in this document, relational terms such as first and second, top and bottom, and the like may be used solely to distinguish one entity or action from another entity or action without necessarily requiring or implying any actual such relationship or order between such entities or actions. The terms “comprises,” “comprising,” “has,” “having,” “includes,” “including,” “contains,” “containing” or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises, has, includes, contains a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises . . . a”, “has . . . a”, “includes . . . a”, “contains . . . a” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises, has, includes, contains the element. The terms “a” and “an” are defined as one or more unless explicitly stated otherwise herein. The terms “substantially”, “essentially”, “approximately”, “about” or any other version thereof, are defined as being close to as understood by one of ordinary skill in the art. In one non-limiting embodiment the terms are defined to be within for example 10%, in another possible embodiment within 5%, in another possible embodiment within 1%, and in another possible embodiment within 0.5%. The term “coupled” as used herein is defined as connected or in contact either temporarily or permanently, although not necessarily directly and not necessarily mechanically. A device or structure that is “configured” in a certain way is configured in at least that way, but may also be configured in ways that are not listed.

To the extent that the materials for any of the foregoing embodiments or components thereof are not specified, it is to be appreciated that suitable materials would be known by one of ordinary skill in the art for the intended purposes.

The Abstract of the Disclosure is provided to allow the reader to quickly ascertain the nature of the technical disclosure. It is submitted with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in various embodiments for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus, the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

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What is claimed is:

1. A lateral arm awning assembly comprising:

first and second articulating arms having first and second ends, said first ends of said articulating arms being mounted upon assembly to a support surface at separate lateral locations, the first ends each comprising separate pivoting mounting structures for forming a pivotally fixedly connection with said first and second articulating arms; and

a roller tube having spaced lateral ends supporting respective end brackets that provide a pivotally fixedly connection to said second ends of said first and second articulating arms;

said roller tube supporting a canopy coupled to a roller shaft, wherein one of the end brackets further supports a drive that drives said roller shaft for furling and unfurling said canopy;

said canopy when in an unfurled position forming a plane such that said first and second articulating arms are disposed to remain substantially parallel with said plane during the operation of the awning assembly as the canopy extends from a furled to an unfurled position;

said roller tube moving relative to said support surface as the canopy extends from the furled position to the unfurled position to move said roller tube away from said support surface, said lateral arm awning assembly being supported solely by said first and second articulating arms when the canopy is in the unfurled position.

2. The lateral arm awning assembly of claim 1 wherein said drive comprises a drive motor.

3. The lateral arm assembly of claim 1 further comprising first and second springs each coupled to respective first and second lateral arms, said first and second springs providing tension to said canopy during movement between the furled and unfurled positions of the awning assembly.

4. The lateral arm assembly of claim 3 wherein said first and second lateral arms further comprise an extruded tube having a central cavity formed by a plurality of sidewalls, wherein one of said plurality of sidewalls includes a channel extending along the length of said first and second lateral arms for supporting and concealing said first and second springs when said canopy is in the furled position.

5. The lateral arm assembly of claim 3 wherein said first and second springs are disposed to remain substantially parallel with said plane during the operation of the awning assembly as the canopy extends from the furled to the unfurled position.

6. A lateral arm awning assembly for attachment to a support structure, said assembly comprising:

first and second mounting plates mounted upon assembly directly to the structure at separate lateral locations;

first and second articulating arms each including a proximal arm pivotally connected to a distal arm, said proximal arm of each of said first and second articulating arms comprising separate pivoting mounting structures for forming a pivotally fixedly connection with said first and second mounting plates; and

a roller tube having spaced lateral ends supporting respective end brackets that provide a pivotally fixedly connection to said second ends of said first and second articulating arms;

said roller tube supporting a canopy coupled to a roller shaft, wherein one of the end brackets further supports a drive that drives said roller shaft for furling and unfurling said canopy;



said canopy when in an unfurled position forming a plane such that said first and second articulating arms are disposed to remain substantially parallel with said plane during the operation of the awning assembly as the canopy extends from a furled to an unfurled position, said lateral arm awning assembly being supported solely by said first and second articulating arms when said canopy is in the unfurled position. 5

7. The lateral arm assembly of claim 6 further comprising first and second springs each coupled to respective first and second lateral arms, said first and second springs providing tension to said canopy during movement between the furled and unfurled positions of the awning assembly. 10

8. The lateral arm assembly of claim 7 wherein said first and second lateral arms further comprise an extruded tube having a central cavity formed by a plurality of sidewalls, wherein one of said plurality of sidewalls includes a channel extending along the length of said first and second lateral arms for supporting and concealing said first and second second springs when said canopy is in the furled position. 15 20

9. The lateral arm assembly of claim 7 wherein said first and second springs are disposed to remain substantially parallel with said plane during the operation of the awning assembly as the canopy extends from the furled to the unfurled position. 25

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